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**Yoon et al.**

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(54) **BEVERAGE MAKER AND METHOD FOR MANUFACTURING COVER OF BEVERAGE MAKER**

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**C12C 11/00** (2006.01)  
**C12C 13/10** (2006.01)

(52) **U.S. Cl.**  
CPC ..... **E04B 1/8409** (2013.01); **C12C 11/006** (2013.01); **C12C 13/10** (2013.01)

(58) **Field of Classification Search**  
None  
See application file for complete search history.

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(57) **ABSTRACT**

A beverage maker and a method for manufacturing a cover for a beverage maker are provided. The beverage maker may include a base, a tank case spaced upward from the base and in which a tank configured to contain a fluid for making a beverage may be accommodated, a machine room defined between the base and the tank case, a cover configured to cover the tank case and the machine room at one side, a sound absorption pad attached to an inner surface of the cover, the sound absorption pad being disposed within the machine room or facing the machine room, and at least one sound absorption member compressed between the inner surface of the cover and an outer surface of the tank case.

**11 Claims, 16 Drawing Sheets**

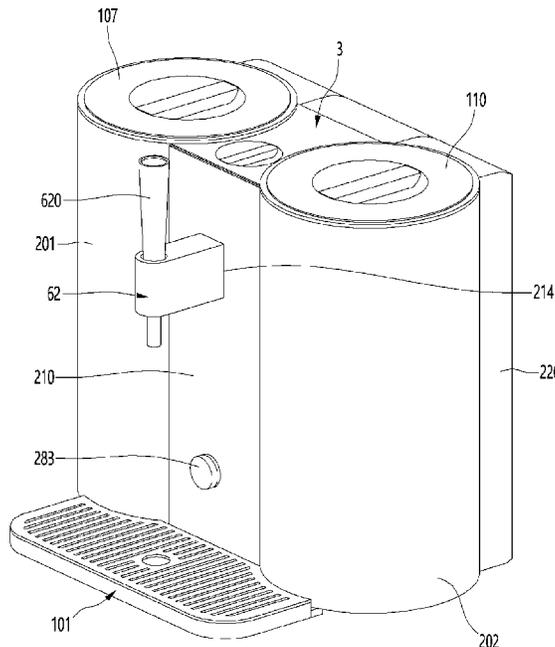


FIG. 1

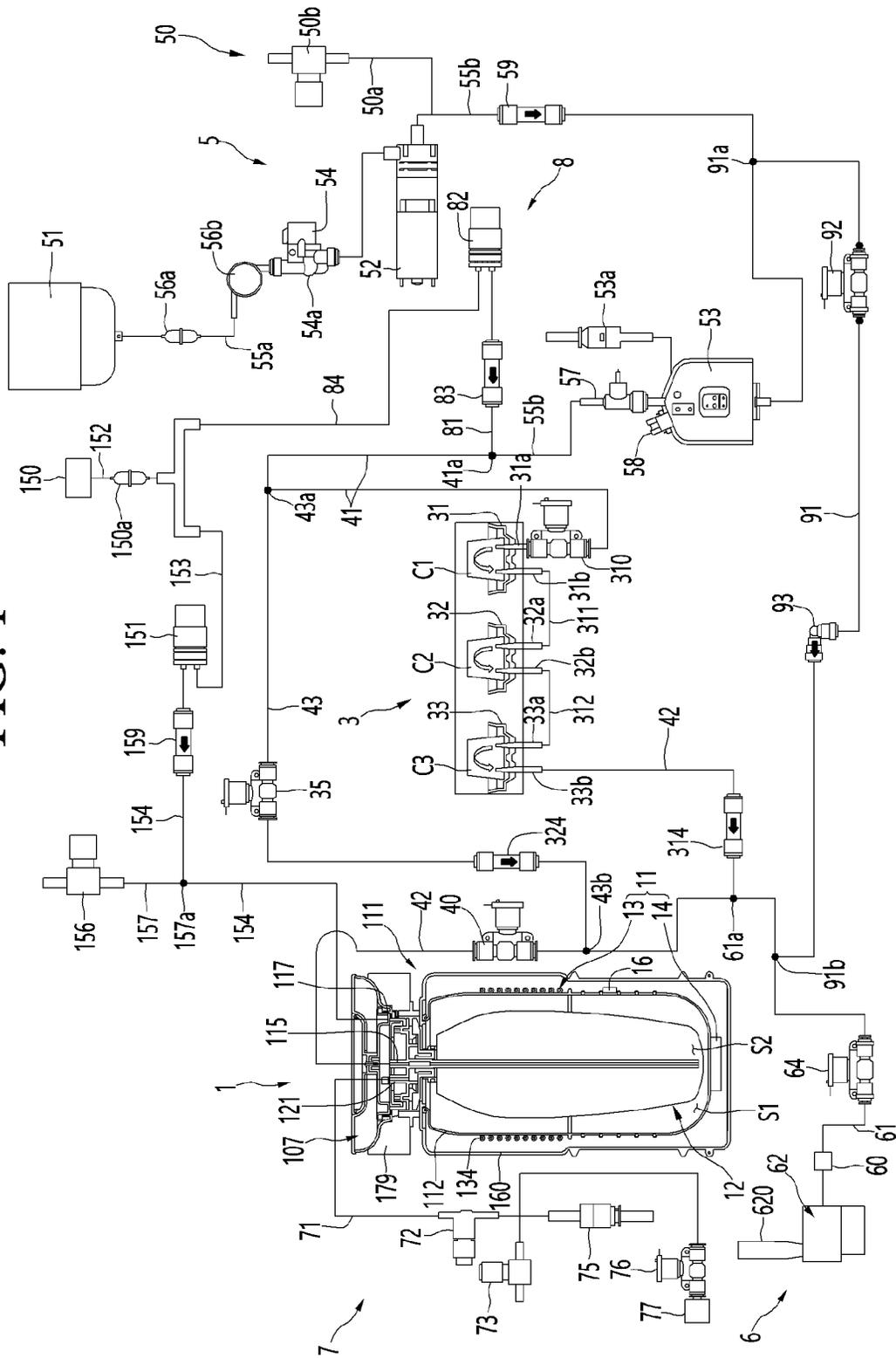


FIG. 2

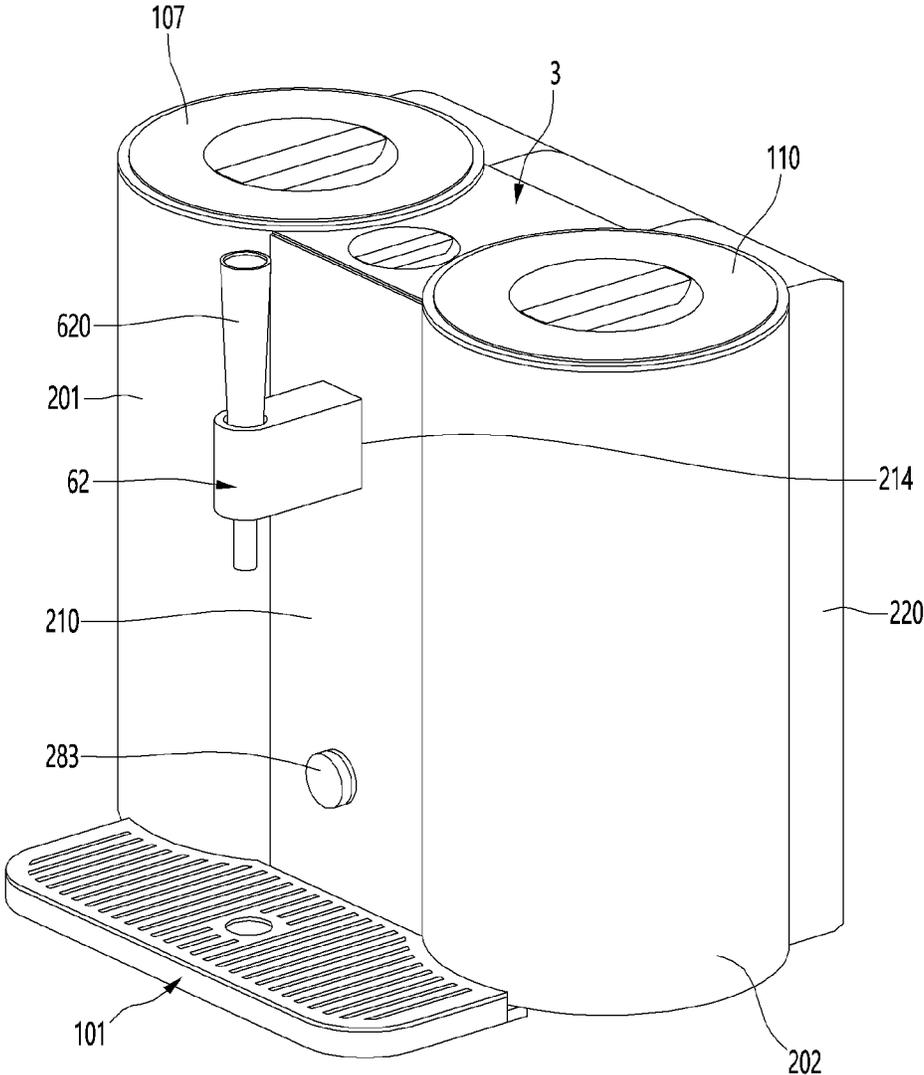


FIG. 3

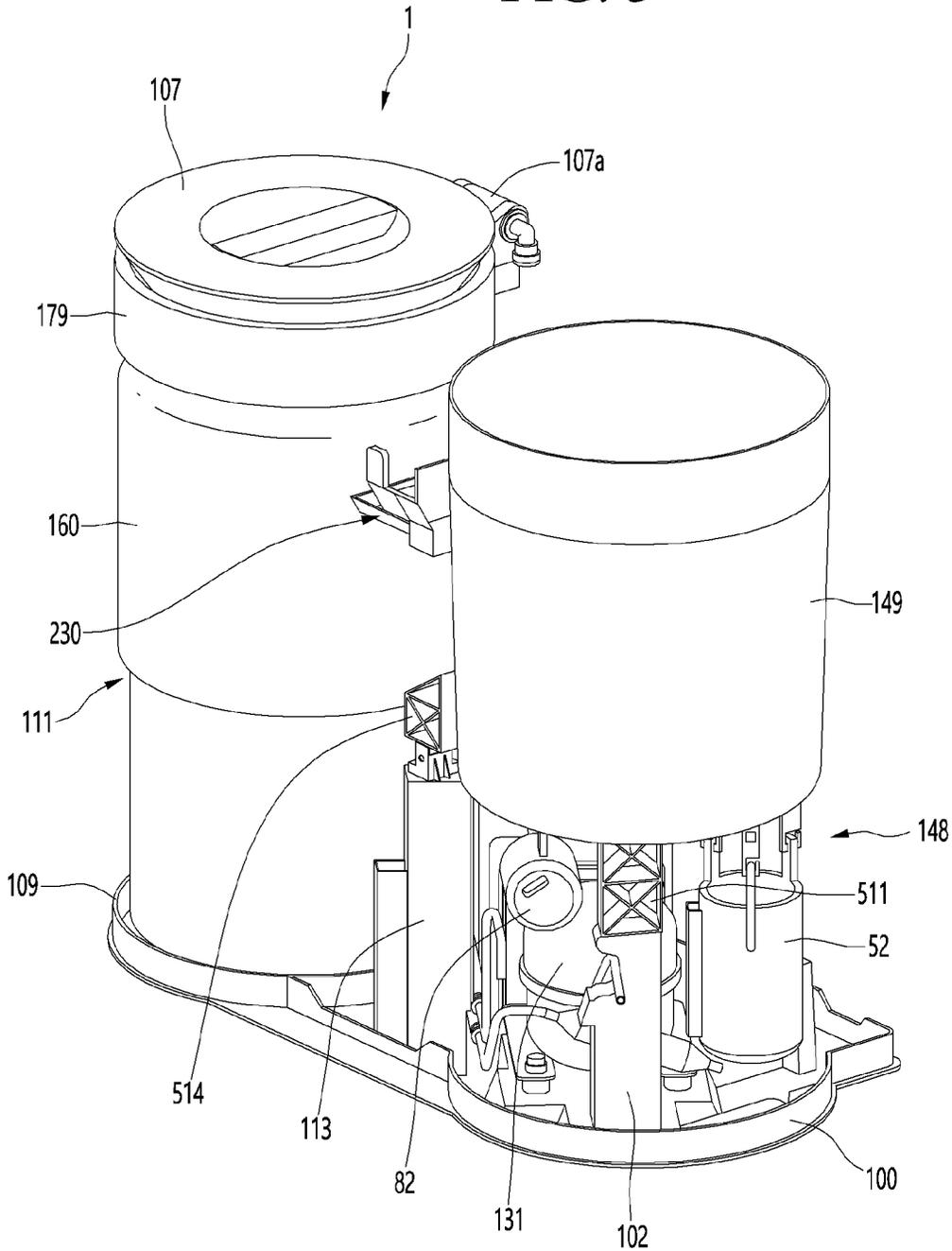


FIG. 4

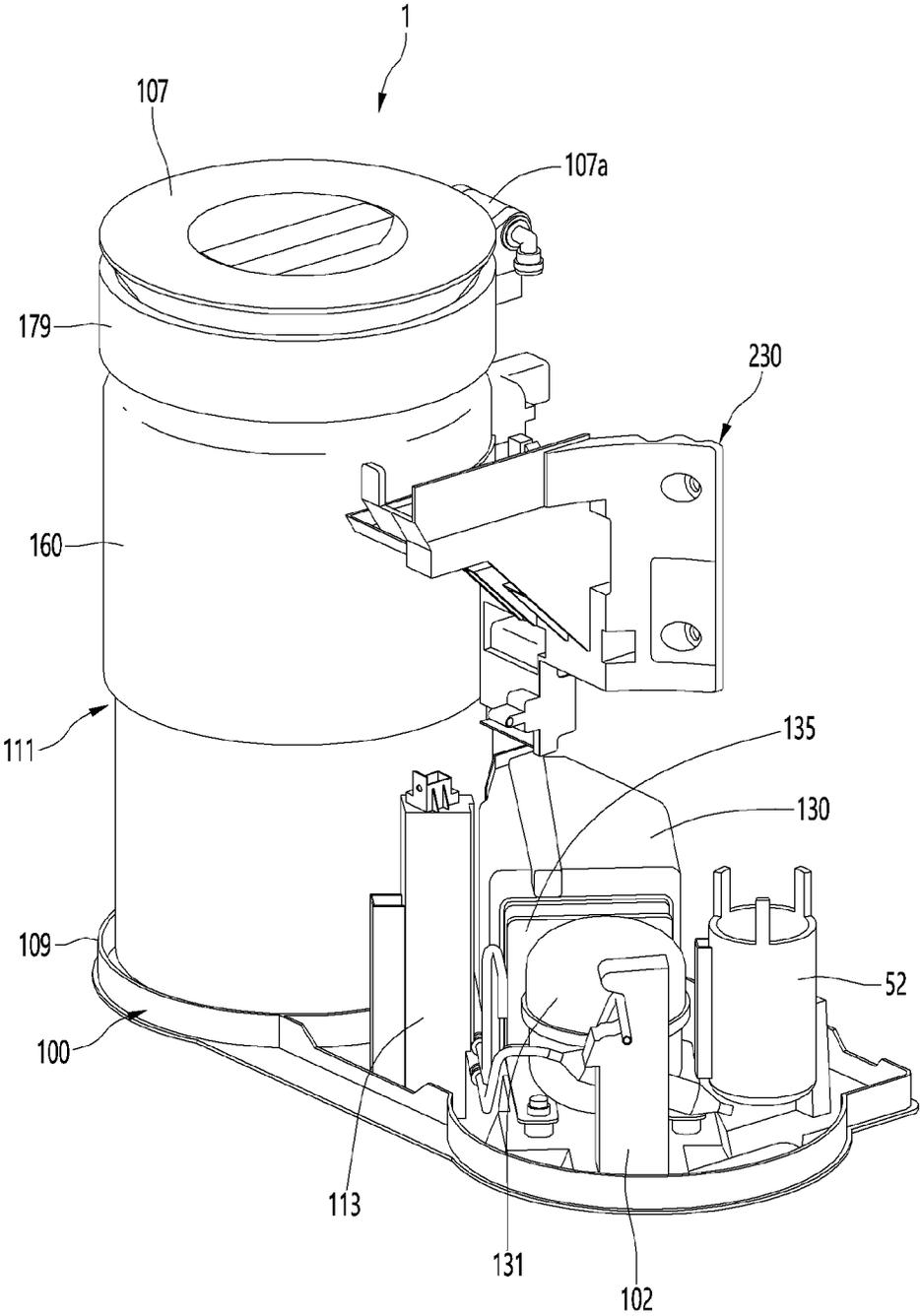


FIG. 5

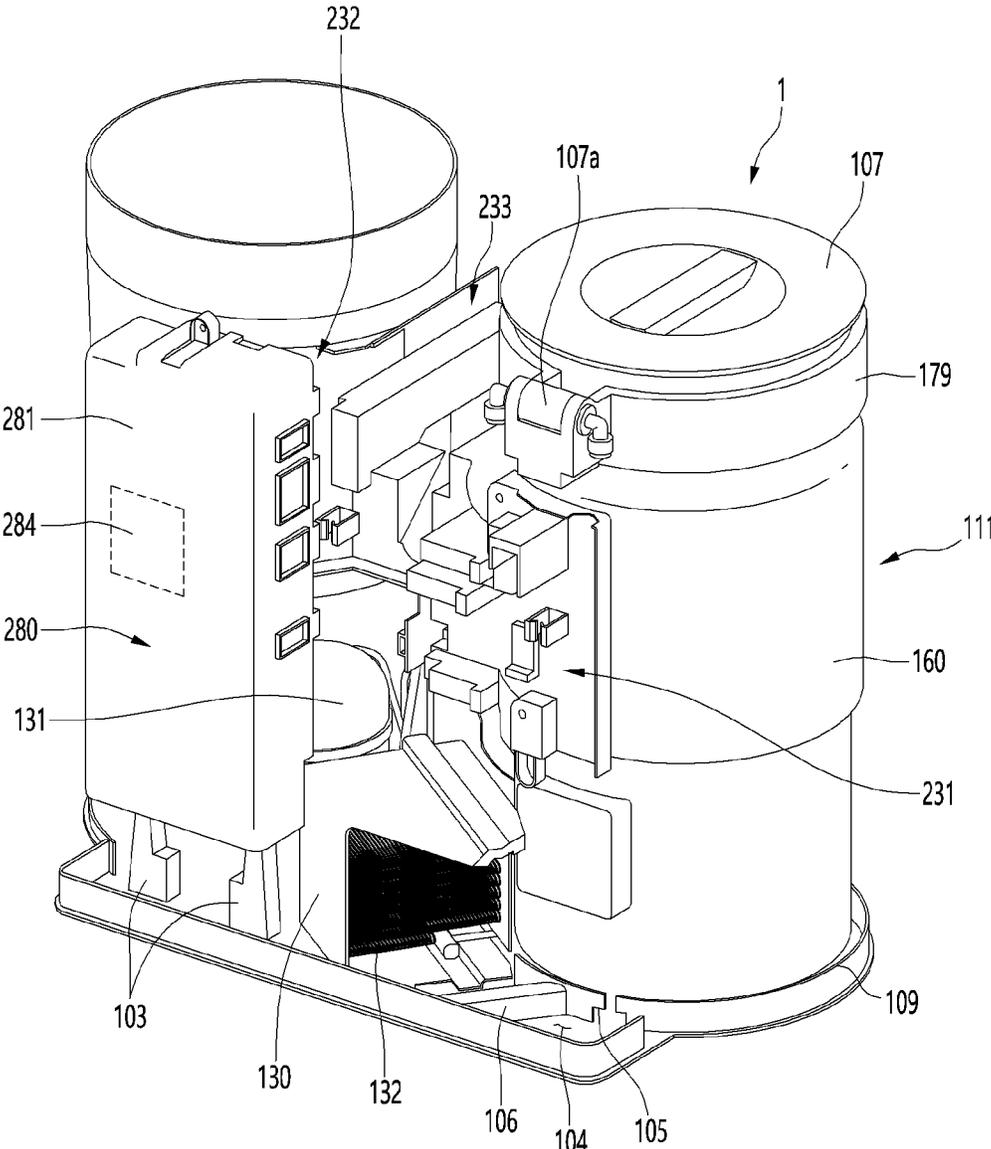


FIG. 6

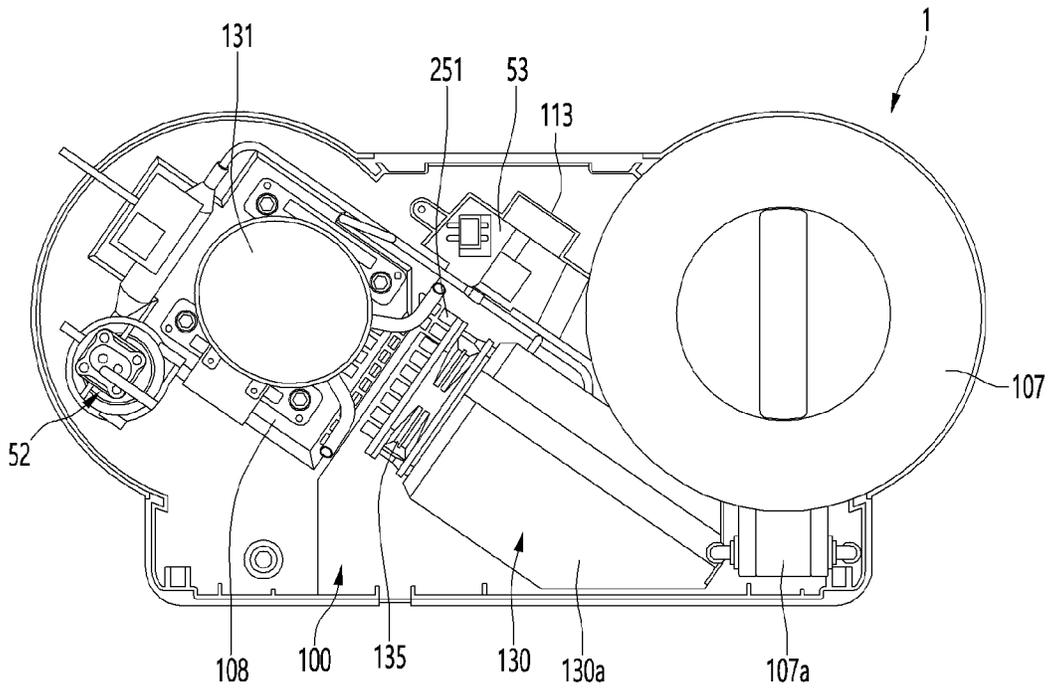


FIG. 7

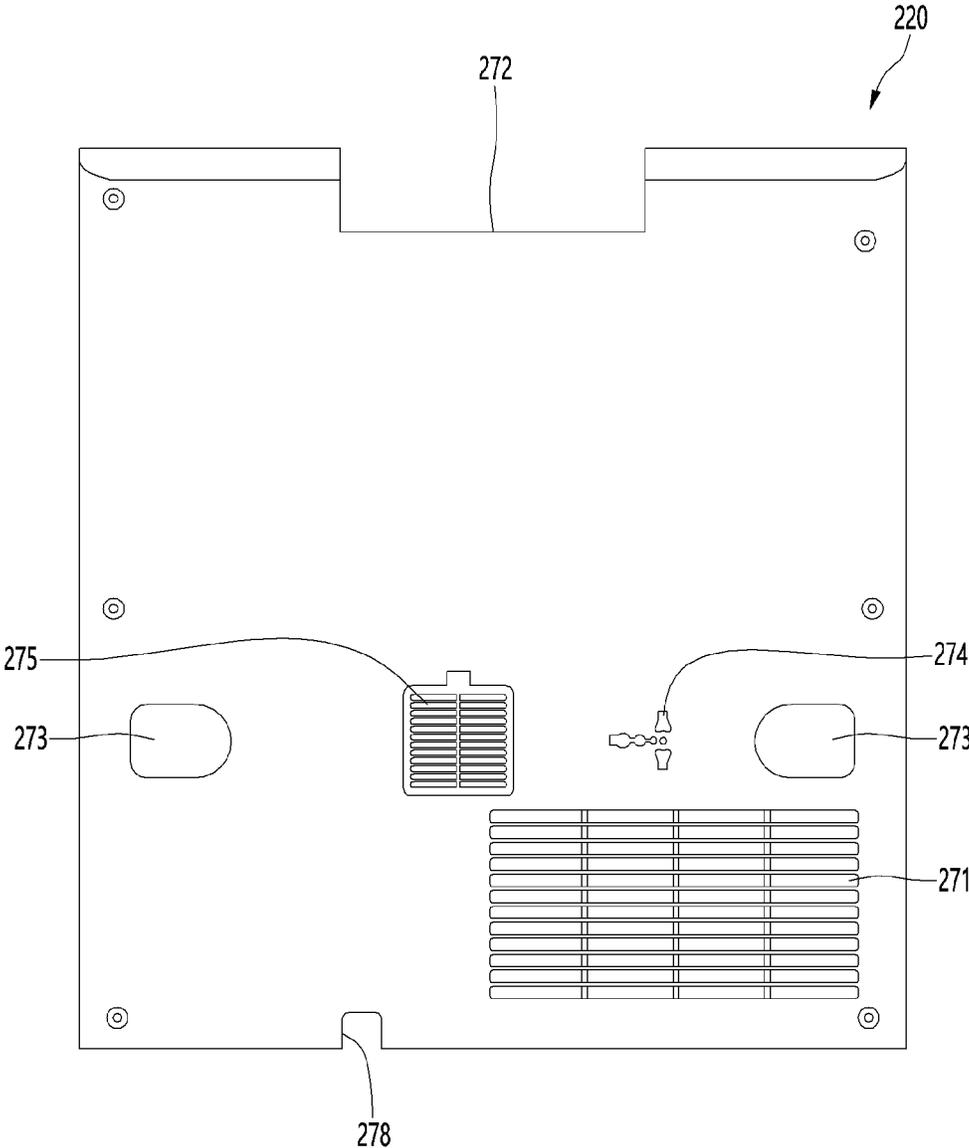


FIG. 8

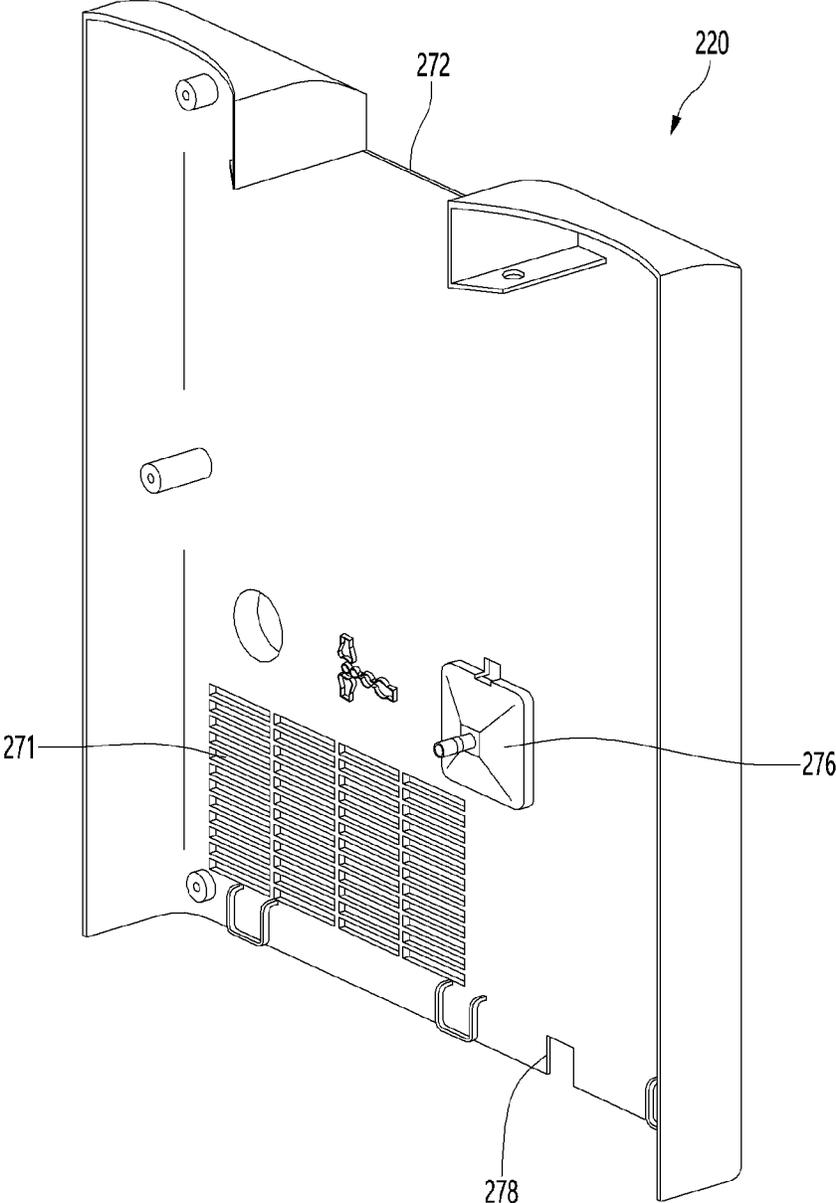


FIG. 9

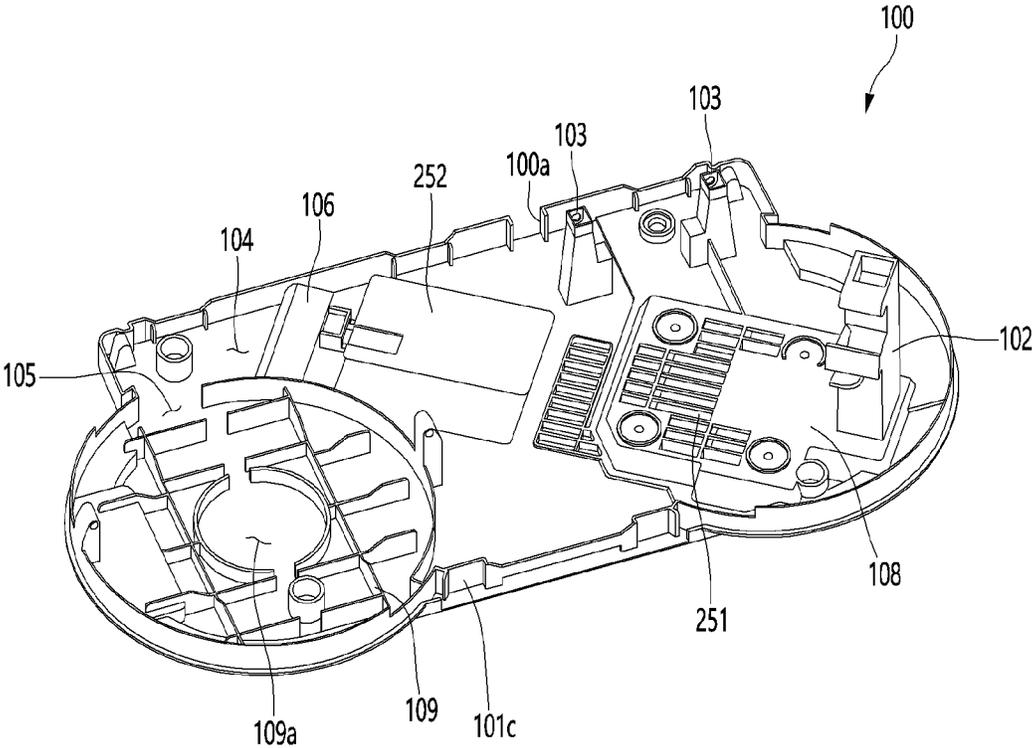


FIG. 10

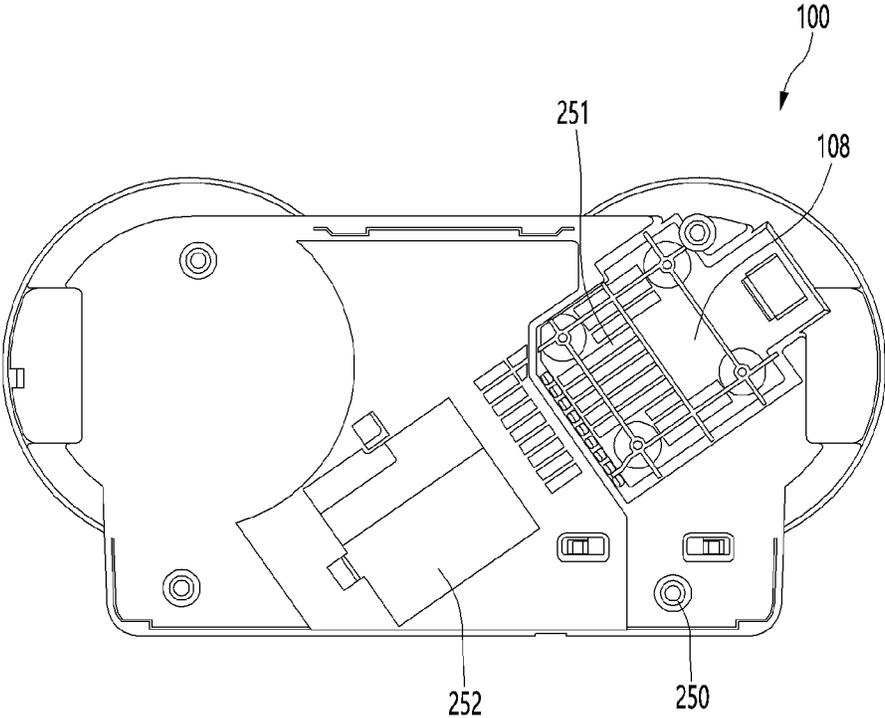


FIG. 11

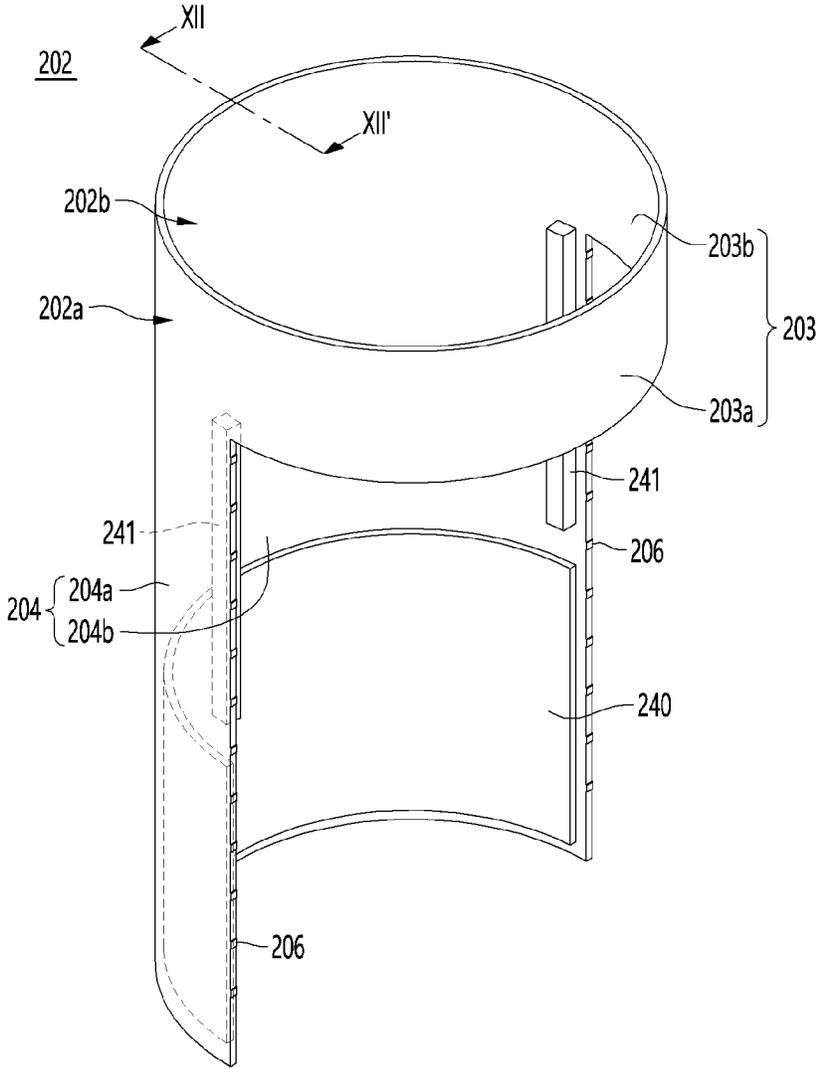


FIG. 12

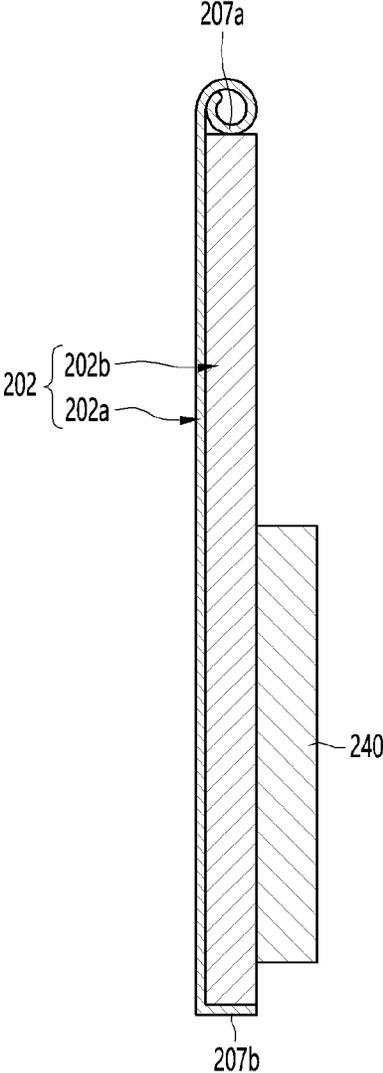


FIG. 13

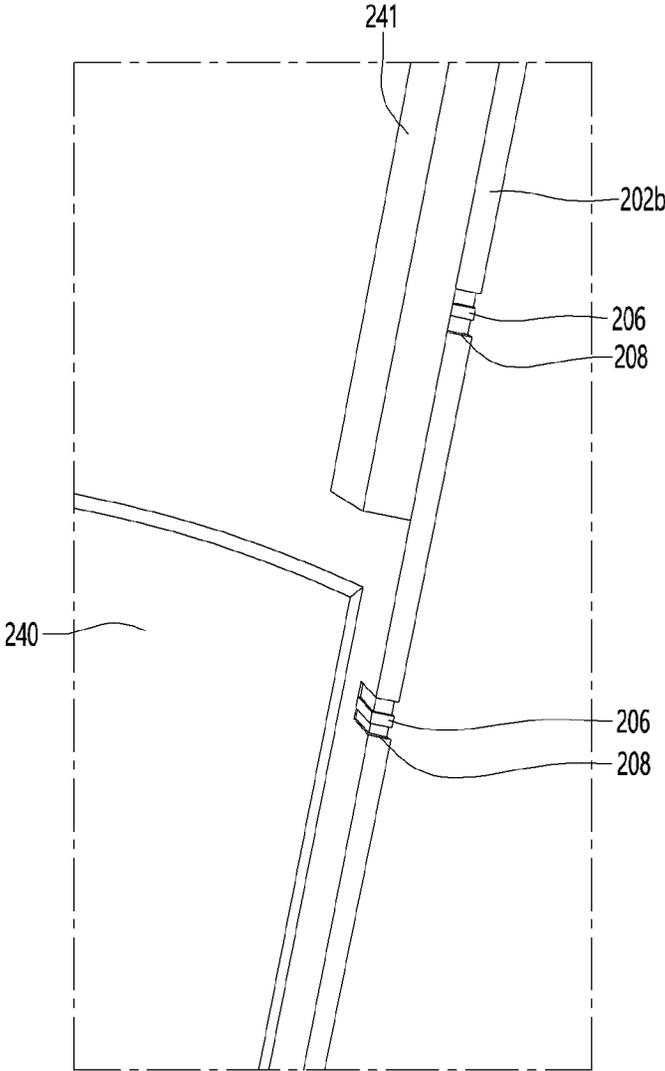


FIG. 14

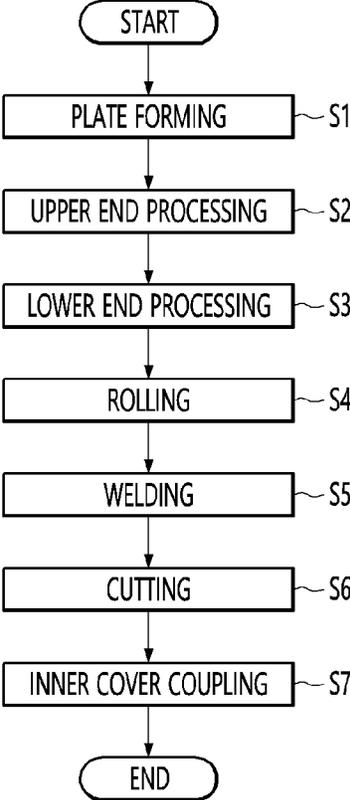


FIG. 15

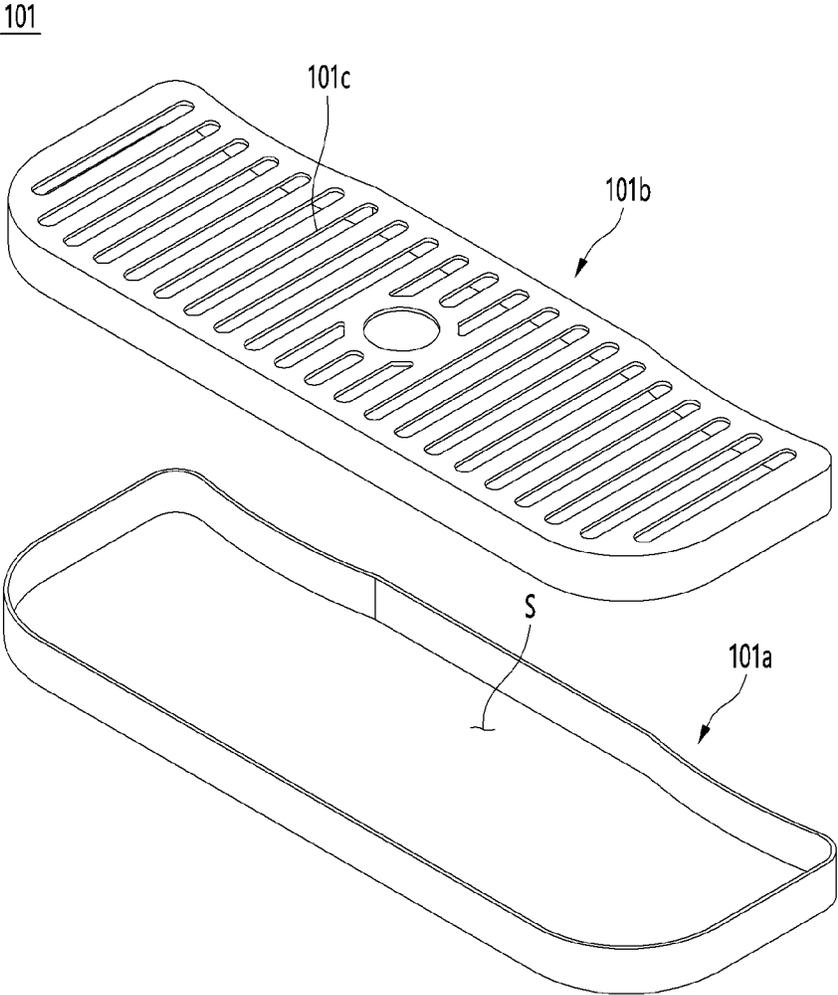
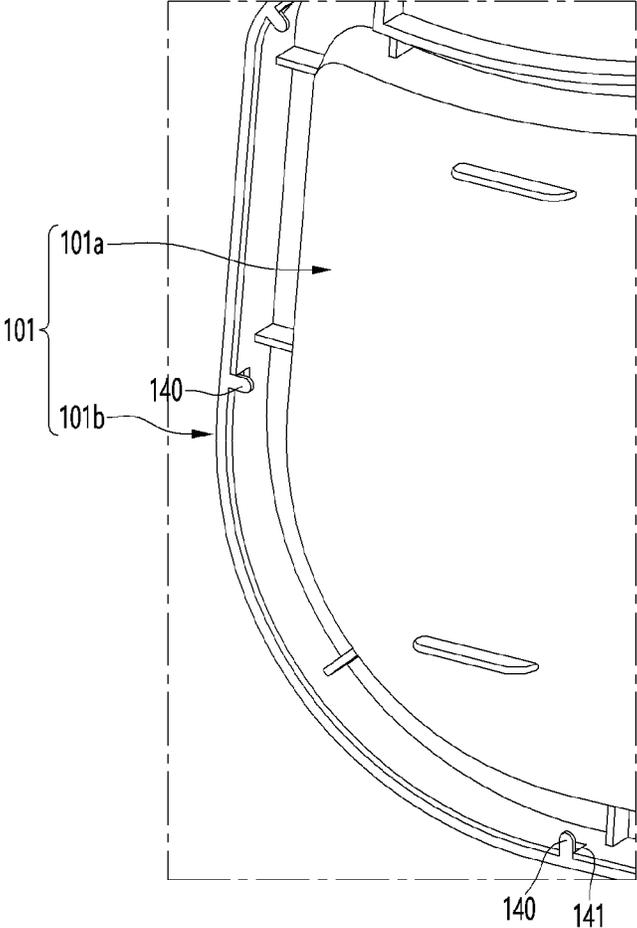


FIG. 16



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## BEVERAGE MAKER AND METHOD FOR MANUFACTURING COVER OF BEVERAGE MAKER

### CROSS-REFERENCE TO RELATED APPLICATION(S)

The present application claims priority under 35 U.S.C. 119 and 35 U.S.C. 365 to Korean Patent Application No. 10-2019-0056544 filed in Korea on May 14, 2019, which is hereby incorporated by reference in its entirety.

### BACKGROUND

#### 1. Field

A beverage maker and a method for manufacturing a cover of a beverage maker are disclosed herein.

#### 2. Background

Beverages are collectively referred to as drinkable liquids, such as alcohol or tea. For example, beverages may be divided into various categories, such as water (a beverage) to solve thirst, juice beverages with unique flavor and taste, refreshing beverages giving a refreshing sensation, favorite beverages with an arousal effect, or alcoholic beverages with an alcohol effect.

Representative examples of such a beverage is beer. The beer is an alcoholic beverage made by making juice of malt sprouting from barley, filtering the juice, adding hop, and fermenting the juice using the yeast.

Consumers may purchase ready-made products made and sold by a beer maker or make beer at home (hereinafter “homemade” beer) by directly fermenting beer ingredients at home or in a bar. Homemade beer may be made in a variety of types and may be made to suit a consumer’s taste.

The ingredients for making beer may include water, malt, hop, fermentation accelerators, and flavoring additives, for example. The fermentation accelerators, which are called yeast, may be added to malt to ferment the malt and help to produce alcohol and carbonic acid. The flavor additives are additives that enhance the taste of beer, such as fruit, syrup, and vanilla beans, for example.

Generally, homemade beer may include three stages or operations, namely, a wort stage or operation, a fermentation stage or operation, and an aging stage or operation, and it may take about two to three weeks from the wort stage or operation to the aging stage or operation. It is important for the homemade beer to maintain an optimum temperature during the fermentation operation, and the easier the beer is to make, the more user convenience is improved.

Recently, a beverage maker capable of easily making beer at home or in a bar has been gradually used. It is preferable that such a beverage maker be capable of safely and easily making beer.

### BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments will be described in detail with reference to the following drawings in which like reference numerals refer to like elements, and wherein:

FIG. 1 is a schematic view of a beverage maker according to an embodiment;

FIG. 2 is a perspective view of a beverage maker according to an embodiment;

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FIG. 3 is a perspective view illustrating a state in which a cover, a residual fluid tray, and an ingredient supplier are removed in the beverage maker of FIG. 2;

FIG. 4 is perspective view illustrating a state in which a tank case is removed in the beverage maker of FIG. 3;

FIG. 5 is a rear perspective view of the beverage maker of FIG. 3;

FIG. 6 is a plan view illustrating a state in which a main frame is removed in the beverage maker of FIG. 4;

FIG. 7 is a rear view of a rear cover according to an embodiment;

FIG. 8 is a perspective view of the rear cover of FIG. 7;

FIG. 9 is a perspective view of a base according to an embodiment;

FIG. 10 is a bottom view of the base of FIG. 9;

FIG. 11 is a perspective view of a tank case cover according to an embodiment;

FIG. 12 is a cross-sectional view, taken along line XII-XII of FIG. 11;

FIG. 13 is an enlarged view illustrating a surrounding area of a hook of the tank case cover according to an embodiment;

FIG. 14 is a schematic flowchart of a method for manufacturing a tank case cover according to an embodiment;

FIG. 15 is an exploded perspective view of a residual fluid tray according to an embodiment; and

FIG. 16 is a bottom view of the residual fluid tray according to an embodiment.

### DETAILED DESCRIPTION

Hereinafter, embodiments will be described with reference to the accompanying drawings. Wherever possible, the same or like reference numerals have been used to indicate the same or like elements and repetitive disclosure has been omitted.

Although beer is exemplified as a beverage made using a beverage maker according to embodiments, a kind of beverage capable of being made using the beverage maker is not limited to beer. For example, various kinds of beverages may be made using the beverage maker according to embodiments.

FIG. 1 is a schematic view of a beverage maker according to an embodiment. The beverage maker may include a fermentation module 1. A beverage may be fermented in the fermentation module 1. The beverage maker may include a temperature controller that controls an inner temperature of the fermentation module 1.

The beverage maker may include a fluid supply module 5. The fluid supply module 5 may supply a fluid, such as water.

The beverage maker may include ingredient supplier 3 provided with ingredient accommodation portions 31, 32, and 33 in which ingredients required for making a beverage may be accommodated. The beverage maker may include main channels 41 and 42 that connect the fluid supply module 5 to the fermentation module 1.

The beverage maker may include a beverage dispenser 6 that dispenses the beverage made in the fermentation module 1 to the outside. The beverage dispenser 6 may be connected to second main channel 42. Thus, the beverage dispensed from the fermentation module 1 may be guided to the beverage dispenser 6 by passing through a portion of the second main channel 42.

The beverage maker may further include a gas discharger 7. The gas discharger 7 may be connected to the fermentation module 1 to discharge a gas generated while the beverage is made.

The beverage maker may further include an air injector **8** that injects air. The air injector **8** may be connected to the fluid supply module **5** or first main channel **41**. The air injector **8** may include an air injection pump **82**.

The beverage maker may further include an air controller **15** that controls a pressure between an inner wall of a fermenter **112** and an outer surface of a fermentation container **12**.

The beverage maker may further include a sub channel **91**. The sub channel **91** may connect the fluid supply module **5** to the beverage dispenser **6**.

The beverage maker may further include an air removal module **50** that removes air within a supply pump **52** of the fluid supply module **5**.

Hereinafter, the fermentation module **1** will be described.

The fermentation module **1** may include a fermenter module **111** having an opening **170** and fermentation lid **107** that opens and closes the opening **170**. The fermenter module **111** may include a fermentation case **160** and fermenter **112** accommodated in the fermentation case **160** and having an inner space **S1**. An insulation portion (not shown) may be provided between the fermentation case **160** and the fermenter **112**. The fermenter module **111** may further include a lid seating body **179** on which the fermentation lid **107** may be seated.

Each of the fermentation case **160** and the fermenter **112** may be provided as an assembly of a plurality of members or components. The fermentation case **160** may define an outer appearance of the fermenter module **111**.

The fermentation lid **107** may seal an inside of the fermenter module **111** and be disposed on the fermenter module **111** to cover the opening. A main channel, particularly, a main channel connection portion **115** connected to the second main channel **42** may be provided in the fermentation lid **107**.

The fermentation container **12** may be accommodated in the fermenter **112**. The fermentation container **12** may be provided as a separate container so that beverage ingredients and a made beverage do not stain the inner wall of the fermenter **112**. The fermentation container **12** may be separably disposed on or in the fermenter **112**. The fermentation container **12** may be seated on the fermenter **112** to ferment the beverage within the fermenter **112**. After the fermentation container **12** is used, the fermentation container **12** may be withdrawn or removed from the fermenter **112**.

The fermentation container **12** may be a pack containing ingredients for making a beverage. The fermentation container **12** may be made of a flexible material. Thus, the fermentation container **12** may be easily inserted into the fermenter **112** and be contracted and expanded by pressure. However, embodiments are not limited thereto. For example, the fermentation container **12** may be made of a polyethylene terephthalate (PET) material.

The fermentation container **12** may have a beverage making space **S2** in which beverage ingredients may be accommodated, and a beverage made. The fermentation container **12** may have a size less than a size of the inner space **S1** of the fermenter **112**.

The fermentation container **12** may be inserted into and accommodated in the fermenter **112** in a state in which the ingredients are contained in the fermentation container **12**. The fermentation container **12** may be inserted into the fermenter **112** and then accommodated in the fermenter **112** in a state in which the fermentation lid **107** is open.

The fermentation lid **107** may seal the fermenter **112** after the fermentation container **12** is inserted into the fermenter **112**. The fermentation container **12** may assist fermentation

of ingredients in the state in which the fermentation container **12** is accommodated in the space **S1** sealed by the fermenter **112** and the fermentation lid **107**. The fermentation container **12** may be expanded by the pressure therein during the making of the beverage. When air is supplied between the inner wall of the fermenter **112** and the outer surface of the fermentation container **12**, the fermentation container **12** may be compressed by an inner pressure of the fermenter **112**, and the beverage contained in the fermentation container **12** may be taken out.

The fermenter **112** may be disposed inside of the fermentation case **160**. The fermenter **112** may have an outer circumference surface and a bottom surface, which may be spaced apart from an inner surface of the fermentation case **160**. The outer circumference the fermenter **112** may be spaced apart from an inner circumference of the fermentation case **160**, and an outer bottom surface of the fermenter **112** may be spaced apart from an inner bottom surface of the fermentation case **160**.

An insulation portion (not shown) may be provided between the fermentation case **160** and the fermenter **112**. The insulation portion may be disposed in the fermentation case **160** to surround the fermenter **112**. Thus, a temperature of the fermenter **112** may be maintained constant. The insulation portion may be made of a material, such as foamed polystyrene or polyurethane, which has high thermal insulating performance and absorbs vibration.

The fermenter **112** may include a temperature sensor **16** that senses a temperature of the fermenter **112**. The temperature sensor **16** may be mounted on a circumferential surface of the fermenter **112**. The temperature sensor **16** may be disposed below an evaporator **134** wound around the fermenter **112**.

Hereinafter, a temperature controller **11** will be described.

Temperature controller **11** may change a temperature of the fermenter **112**. The temperature controller **11** may heat or cool the fermenter **112** to control the temperature of the fermenter **112** at an optimal temperature for fermenting the beverage.

The temperature controller **11** may include at least one of a refrigeration cycle device **13** or a heater **14**. However, embodiments are not limited thereto. For example, the temperature controller **11** may include a thermoelement (TEM).

The refrigeration cycle device **13** may control the temperature of the fermenter **112**. The refrigeration cycle device **13** may include a compressor, a condenser, an expansion mechanism, and the evaporator **134**.

The evaporator **134** may contact an outer surface of the fermenter **112**. The evaporator **134** may be an evaporation tube wound around the outer surface of the fermenter **112**, for example. The evaporator **134** may be accommodated between the fermenter **112** and the insulation portion to cool the fermenter **112** which is insulated by the insulation portion.

The temperature controller **11** may further include heater **14** that heats the fermenter **112**. The heater **14** may contact the bottom surface of the fermenter **112**. The heater **14** may be a heat generation heater that generates heat when power is applied, for example. The heater **14** may be a plate heater, for example. Thus, natural convection of a fluid may be generated inside of the fermenter **112** by the evaporator **134** and the heater **14**, and temperature distribution inside the fermenter **112** and the fermentation container **12** may be uniform.

Hereinafter, main channels **41** and **42** and a bypass channel **43** will be described.

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The main channels **41** and **42** may include first main channel **41** that connects the fluid supply module **5** to the ingredient supplier **3** and second main channel **42** that connects the ingredient supplier **3** to the fermentation module **1**. That is, the first main channel **41** may guide a fluid, such as water supplied from the fluid supply module **5** to the ingredient supplier **3**, and the second main channel **42** may guide a mixture of the ingredients and the fluid, which are extracted from the ingredient supplier **3**, to the fermentation module **1**. The first main channel **41** may have one or a first end **41a** connected to the fluid supply module **5** and the other or a second end connected to the ingredient supplier **3**, more particularly, an inlet of an initial ingredient accommodation portion **31**, which will be described hereinafter.

An ingredient supply valve **310** that opens and closes the first main channel **41** may be installed in the first main channel **41**. The ingredient supply valve **310** may be provided in the ingredient supplier **3**.

The ingredient supply valve **310** may be opened when additives accommodated in the ingredient accommodation portions **31**, **32**, and **33** are input to open the first main channel **41**. The ingredient supply valve **310** may be opened when the ingredient accommodation portions **31**, **32**, and **33** are cleaned to open the first main channel **41**.

The second main channel **42** may have one or a first end connected to main channel connection portion **115** of the fermentation module **1** and the other or a second end connected to the ingredient supplier **3**, more particularly, an outlet **33b** of a final ingredient accommodation portion **33**, which will be described hereinafter.

A main valve **40** that opens and closes the second main channel **42** may be installed in the second main channel **42**. A main check valve **314** that allows the fluid to flow from the ingredient supplier **3** to the fermentation module **1** may be installed in the second main channel **42**. That is, the main check valve **314** may prevent the fluid from flowing back to the ingredient supplier **3**.

The main check valve **314** may be disposed between the main valve **40** and the ingredient supplier **3** with respect to the second main channel **42**. The main valve **40** may be opened when the fluid is supplied to the fermentation container **12** to open the second main channel **42**. The main valve **40** may be closed while the fermenter **112** is cooled to close the second main channel **42**. The main valve **40** may be opened when air is injected into the fermentation container **12** to open the second main channel **42**. The main valve **40** may be opened when additives are supplied into the fermentation container **12** to open the second main channel **42**. The main valve **40** may be closed to seal the inside of the fermentation container **12** during fermentation of ingredients. The main valve **40** may be closed to seal the inside of the fermentation container **12** when the beverage is aged and stored. The main valve **40** may be opened when the beverage is dispensed by the beverage dispenser **6** to open the second main channel **4**. The beverage within the fermentation container **1** may pass through the main valve **40** to flow to the beverage dispenser **6**.

The main channels **41** and **42** may be provided as one continuous channel when the beverage maker does not include the ingredient supplier **3**. When the beverage maker includes the ingredient supplier **3**, the beverage maker may further include bypass channel **43** configured to allow the fluid or air to bypass the ingredient accommodation portions **31** and **32**.

The bypass channel **43** may bypass the ingredient accommodation portions **31**, **32**, and **33** and then be connected to the first main channel **41** and the second main channel **42**.

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The bypass channel **43** may have one or a first end **43a** connected to the first main channel **41** and the other or a second end **43b** connected to the second main channel **42**. The bypass channel **43** may have the one end **43a** connected to the first main channel **41** between the fluid supply module **5** and the ingredient supply valve **310** and the other end **43b** connected to the second main channel **42** between the main valve **40** and the ingredient supplier **3**.

A bypass valve **35** that opens and closes the bypass channel **43** may be installed in the bypass channel **43**. The bypass valve **35** may be opened to open the bypass channel **43** when the fluid supplied from the fluid supply module **5** is supplied to the fermentation container **12**. The bypass valve **35** may be opened to open the bypass channel **43** when air injected from the air injector **8** is supplied to the fermentation container **12**. The bypass valve **35** may be opened to open the bypass channel **43** when the bypass channel **43** is cleaned.

A bypass check valve **324** that allows the fluid to flow from the first main channel **41** to the second main channel **42** may be installed in the bypass channel **43**. That is, the fluid may flow only from the first main channel **41** to the second main channel **42** but may not flow in the opposite direction. The bypass check valve **324** may be disposed between the bypass valve **35** and the second main channel **42** with respect to the bypass channel **43**.

Hereinafter, the ingredient supplier **3** will be described.

When beer is made using the beverage maker, the ingredients for making the beer may include a fluid, such as water, malt, a fermentation facilitator, for example, yeast, hop, and a flavoring additive, for example. The beverage maker may include both the ingredient supplier **3** and the fermentation container **12**. The ingredients for making the beverage may be accommodated in and divided between the ingredient supplier and the fermentation container **12**. A portion of the ingredients for making the beverage may be accommodated in the fermentation container **12**, and the remaining ingredients may be accommodated in the ingredient supplier **3**. The remaining ingredients accommodated in the ingredient supplier **3** may be supplied to the fermentation container **12** together with the fluid supplied from the fluid supply module **5** and mixed with the portion of the ingredients accommodated in the fermentation container **12**.

A main ingredient which is essential for making a beverage may be accommodated in the fermentation container **12**, and additives added to the main ingredient may be accommodated in the ingredient supplier **3**. In this case, the additives accommodated in the ingredient supplier **3** may be mixed with the fluid supplied from the fluid supply module **5** and supplied to the fermentation container **12** and then may be mixed with the main ingredient accommodated in the fermentation container **12**.

The main ingredient accommodated in the fermentation container **12** may have a capacity or amount greater than a capacity or amount of other ingredients. For example, when beer is made, the main material may be malt of the malt, the fermentation facilitator, the hop, and the flavoring additive. Also, the additives accommodated in the ingredient supplier **3** may be the other ingredient except for the malt of the ingredients for making the beer, for example, the fermentation facilitator, the hop, and the flavoring additive.

The beverage maker may not include the ingredient supplier **3** but may include only the fermentation container **12**. In this case, the main ingredient may be accommodated in the fermentation container **12**, and a user may directly put the additives into the fermentation container **12**.

If the beverage maker includes both the ingredient supplier **3** and the fermentation container **12**, the beverage may be more easily made. Hereinafter, a case in which the beverage maker includes both the ingredient supplier **3** and the fermentation container, will be described as an example. However, embodiments are not limited to the case in which the beverage maker includes both the ingredient supplier **3** and the fermentation container **12**.

The ingredients within the fermentation container **12** may be fermented as time elapses, and the beverage made in the fermentation container **12** may flow to the second main channel **42** through the main channel connection portion **115** and also flow from the second main channel **42** to the beverage dispenser **6** so as to be dispensed. The ingredients necessary for making the beverage may be accommodated in the ingredient supplier **3**, and the fluid supplied from the fluid supply module **5** may pass through ingredient supplier **3**. For example, when the beverage made in the beverage maker is beer, the ingredients accommodated in the ingredient supplier **3** may be the fermentation facilitator, the hop, and the flavoring additive, for example.

The ingredients accommodated in the ingredient supplier **3** may be directly accommodated in the ingredient accommodation portions **31**, **32**, and **33** provided in the ingredient supplier **3**. At least one ingredient accommodation portion **31**, **32**, and **33** may be provided in the ingredient supplier **3**. Further, a plurality of ingredient accommodation portions **31**, **32**, and **33** may be provided in the ingredient supplier **3**. In this case, the ingredient accommodation portions **31**, **32**, and **33** may be partitioned with respect to each other.

Inlets **31a**, **32a**, and **33a** through which fluid may be introduced and outlets **31b**, **32b**, and **33b** through which the fluid may be discharged may be provided in the ingredient accommodation portions **31**, **32**, and **33**, respectively. The fluid introduced into the inlet of one ingredient accommodation portion may be mixed with ingredients within the ingredient accommodation portion and then discharged through the outlet.

The ingredients accommodated in the ingredient supplier **3** may be accommodated in ingredient containers **C1**, **C2**, and **C3**. In this case, the ingredient containers **C1**, **C2**, and **C3** may be accommodated in the ingredient accommodation portions **31**, **32**, and **33**, and each of the ingredient accommodation portions **31**, **32**, and **33** may be referred to as an "ingredient container mounting portion".

The ingredient containers **C1**, **C2**, and **C3** may each include a capsule or a pod; however, embodiments are not limited thereto. When the ingredients are accommodated in the ingredient containers **C1**, **C2**, and **C3**, the ingredient supplier **3** may be configured so that the ingredient containers **C1**, **C2**, and **C3** are seated therein and withdrawn therefrom. The ingredient supplier **3** may be provided as an ingredient containers kit assembly in which the ingredient containers **C1**, **C2**, and **C3** are separably accommodated.

For example, a first additive, a second additive, and a third additive may be accommodated in the ingredient supplier **3**. The first additive may be the fermentation facilitator, the second additive may be the hop, and the third additive may be the flavoring additive. The ingredient supplier **3** may include a first ingredient container mounting portion **31** in which a first ingredient container **C1** containing the first additive is accommodated, a second ingredient container mounting portion **32** in which a second ingredient container **C2** containing the second additive is accommodated, and a third ingredient container mounting portion **33** in which a third ingredient container **C3** containing the third additive is accommodated.

The ingredients contained in the ingredient accommodation portion or the ingredient containers **C1**, **C2**, and **C3** may be extracted by a fluid pressure of the fluid supplied from the fluid supply module **5**. When the ingredients are extracted by the fluid pressure, the fluid supplied from the fluid supply module **5** to the first main channel **41** may pass through the ingredient accommodation portion or the ingredient containers **C1**, **C2**, and **C3** and then be mixed with the ingredients, and the ingredients accommodated in the ingredient accommodation portion or the ingredient containers **C1**, **C2**, and **C3** may flow to the second main channel together with the fluid.

A plurality of additives different from each other may be accommodated separately in the ingredient supplier **3**. For example, when beer is made, the plurality of additives accommodated in the ingredient supplier **3** may be the fermentation facilitator, the hop, and the flavoring additive, which may be accommodated separately from each other.

When the plurality of ingredient accommodation portions are provided in the ingredient supplier **3**, the plurality of ingredient accommodation portions **31**, **32**, and **33** may be connected in series to each other in a flow direction of the fluid. That is, the ingredient supplier **3** may include at least one connecting channel **311** and **312** that connects the outlet of one ingredient accommodation portion of the plurality of ingredient accommodation portions **31**, **32**, and **33** to the inlet of another ingredient accommodation portion.

Further, the plurality of ingredient accommodation portions **31**, **32**, and **33** may include an initial ingredient accommodation portion **31** and a final ingredient accommodation portion **33**. The plurality of ingredient accommodation portions **31**, **32**, and **33** may further include an intermediate ingredient accommodation portion **32**.

The inlet **31a** of the initial ingredient accommodation portion **31** may be connected to the first main channel **41**, and the outlet **33b** of the final ingredient accommodation portion **33** may be connected to the second main channel **42**. The intermediate ingredient accommodation portion **32** may be disposed between the first ingredient accommodation portion **31** and the second ingredient accommodation portion **33** in the flow direction of the fluid. The inlet **32a** and the outlet **32b** of the intermediate ingredient accommodation portion **32** may be connected to the connecting channels **311** and **312** different from each other.

As illustrated in FIG. **1**, when three ingredient accommodation portions are provided in the ingredient supplier **3**, the outlet **31b** of the final ingredient accommodation portion **31** may be connected to the inlet **32a** of the intermediate ingredient accommodation portion **32** through the first connecting channel **311**, and the outlet **32b** of the intermediate ingredient accommodation portion **32** may be connected to the inlet **33a** of the final ingredient accommodation portion **33** through the second connecting channel **312**. In this case, the fluid introduced into the inlet **31a** of the final ingredient accommodation portion **31** through the first main channel **41** may flow to the first connecting channel **311** through the outlet **31b** together with the first additive accommodated in the initial ingredient accommodation portion **31**.

The fluid (a mixture of the fluid and the first additive) introduced into the inlet **32a** of the intermediate ingredient accommodation portion **32** through the first main channel **311** may flow to the second connecting channel **312** through the outlet **32b** together with the second additive accommodated in the intermediate ingredient accommodation portion **32**. The fluid (the mixture of the fluid and the first and second additives) introduced into the inlet **33a** of the final ingredient accommodation portion **33** through the second

main channel **312** may flow to the second connecting channel **42** through the outlet **33b** together with the third additive accommodated in the final ingredient accommodation portion **33**. The fluid (the mixture of the fluid and the first, second, and third additives) discharged through the second main channel **42** may be guided to the main channel connection portion **115** of the fermentation module **1** and then introduced into the fermentation container **12**.

However, the configuration of the ingredient supplier **3** is not limited thereto. For example, when the intermediate ingredient accommodation portion is not provided, two ingredient accommodation portions may be provided in the ingredient supplier **3**. In this case, one ingredient accommodation portion may be the initial ingredient accommodation portion, and the other ingredient accommodation portion may be the final ingredient accommodation portion. The outlet of the initial ingredient accommodation portion and the inlet of the final ingredient accommodation portion may be connected to each other by the connecting channel.

For another example, when a plurality of intermediate ingredient accommodation portions is provided, four or more ingredient accommodation portions may be provided in the ingredient supplier **3**. In this case, one ingredient accommodation portion may be the initial ingredient accommodation portion, another ingredient accommodation portion may be the final ingredient accommodation portion, and the remaining ingredient accommodation portions may be intermediate ingredient accommodation portions. In this case, as the connection between the ingredient accommodation portions in series is easily understood by a person skilled in the art, their detailed descriptions has been omitted.

As the plurality of ingredient accommodation portions **31**, **32**, and **33** is connected in series to each other, a channel configuration of the ingredient supplier **3** may be simplified. Also, as additives contained in the ingredient containers **C1**, **C2**, and **C3** are extracted at once, a time taken to extract the additives may decrease. Also, the ingredient supplier **3** may minimize fluid leakage points to improve reliability.

When the ingredients accommodated in the ingredient supplier **3** are accommodated in the ingredient containers **C1**, **C2**, and **C3**, the initial ingredient accommodation portion **31** may be referred to as an "initial ingredient container mounting portion", the intermediate ingredient accommodation portion **32** may be referred to as an "intermediate ingredient container mounting portion", and the final ingredient accommodation portion **33** may be referred to as a "final ingredient container mounting portion".

Hereinafter, the fluid supply module **5** will be described.

The fluid supply module **5** may include a tank **51**, a pump **52** to pump a fluid, such as water within the tank **51**, and a heater **53** that heats the fluid pumped by the pump **52**. The tank **51** and the pump **52** may be connected to a tank discharge channel **55a**, and the fluid contained in the tank **51** may be introduced into the pump **52** through the tank discharge channel **55a**. The pump **52** and one or a first end of the first main channel **41** may be connected to a fluid supply channel **55b**, and the fluid discharged from the pump **52** may be guided to the first main channel **41** through the fluid supply channel **55b**.

A muffler **56a** that reduces noise and a flow meter **56b** that measures a flow rate of the fluid discharged from the tank **51** may be installed in the tank discharge channel **55a**. The muffler **56a** may be disposed in front of the flow meter **56b** with respect to the flow direction of the fluid.

A flow rate control valve **54** that controls a flow rate of the fluid discharged from the tank **51** may be installed in the tank discharge channel **55a**. The flow rate control valve **54** may include a step motor.

A thermistor **54a** that measures a temperature of the fluid discharged from the tank **51** may be installed in the tank discharge channel **55a**. The thermistor **54a** may be built in the flow rate control valve **54**.

A fluid supply check valve **59** that prevents the fluid from flowing back to the pump **52** may be installed in the fluid supply channel **55b**.

The heater **53** may be installed in the fluid supply channel **55b**. The heater **53** may include a thermostat **58** that constantly adjusts a temperature of the heater **53**.

The fluid supply module **5** may further include a safety valve **53a**. The safety valve **53a** may communicate with an inside of the heater **53**. The safety valve **53a** may restrict a maximum inner pressure of the heater **53**. For example, the safety valve **53a** may restrict the maximum inner pressure of the heater **53** to a pressure of about 3.0 bar.

The fluid supply module **5** may further include a fluid supply temperature sensor **57** that measures a temperature of the fluid passing through the heater **53**. The fluid supply temperature sensor **57** may be connected to the heater **53**.

When the pump **52** is driven, the fluid within the tank **51** may be introduced into the pump **52** through the tank discharge channel **55a**, and the fluid discharged from the pump **52** may be heated in the heater **53** while flowing through the water supply channel **55b** and then be guided to the first main channel **41**.

Hereinafter, the beverage dispenser **6** will be described.

The beverage dispenser **6** may be connected to the second main channel **42**. That is, the beverage dispenser **6** may include dispenser **62** that dispenses the beverage and a beverage dispensing channel **61** that connects the dispenser **62** to the second main channel **42**.

The beverage dispensing channel **61** may connect the second main channel **42** to the dispenser **62**. The beverage dispensing channel **61** may have one or a first end **61a** connected between the main check valve **314** and the main valve **40** with respect to the second main channel **42** and the other or a second end connected to the dispenser **62**.

A beverage dispensing valve **64** that opens and closes the beverage dispensing channel **61** may be installed in the beverage dispensing channel **61**. The beverage dispensing valve **64** may be opened when the beverage is dispensed to open the beverage dispensing channel **61**. The beverage dispensing valve **64** may be opened when residual fluid is removed to open the beverage dispensing channel **61**. The beverage dispensing valve **64** may be opened when the beverage dispenser is cleaned to open the beverage dispensing channel **61**.

A decompression component **60** that prevents a pressure of the beverage passing through the beverage dispensing channel **61** from rapidly increasing may be installed in the beverage dispensing channel **61**. The decompression component **60** may be installed behind the beverage dispensing valve **64** with respect to the dispensing direction of the beverage. The decompression component **60** may be disposed adjacent to the beverage dispensing valve **64**.

The pressure of the beverage passing through the decompression component **60** may gradually decrease. The beverage passing through the decompression component **60** may be dispensed from the dispenser **62** and may not generate excessive bubbles.

When the beverage is dispensed, the beverage dispensing valve **64** may be opened. When the beverage is not dispensed, the beverage dispensing valve **64** may remain closed.

The dispenser **62** may include lever **620**. When the user manipulates the lever **620**, the beverage dispensing valve **64** may be opened, and when the lever **620** returns to its original position, the beverage dispensing valve **64** may be closed.

Hereinafter, the gas discharger **7** will be described.

The gas discharger **7** may be connected to the fermentation module **1** to discharge a gas generated in the fermentation container **12**. The gas discharger **7** may include a gas discharge channel **71** connected to the fermentation module **1**, a gas pressure sensor **72** installed in the gas discharge channel **71**, and a gas discharge valve **73** connected to the gas discharge channel **71**. The gas discharge valve **73** may be disposed behind or downstream of the gas pressure sensor **72** in a gas discharge direction.

The gas discharge channel **71** may be connected to the fermentation module **1**, particularly, the fermentation lid **107**. A gas discharge channel connection portion **121** to which the gas discharge channel **71** may be connected may be provided in the fermentation lid **107**.

The gas within the fermentation container **12** may flow into the gas discharge channel **71** through the gas discharge channel connection portion **121**. The gas pressure sensor **72** may detect a pressure of the gas discharged to the gas discharge channel **71** through the gas discharge channel connection portion **121** within the fermentation container **12**.

The gas discharge valve **73** may be turned on to be opened when air is injected into the fermentation container **12** by the air injector **8**. The beverage maker may uniformly mix the malt with the fluid by injecting the air into the fermentation container **12**. Foam generated in the liquid malt may be discharged from an upper portion of the fermentation container **12** to the outside through the gas discharge channel **71** and the gas discharge valve **73**. The gas discharge valve **73** may be opened or closed at least one time to detect fermentation during a fermentation process or operation.

The gas discharger **7** may further include a safety valve **75** connected to the gas discharge channel **71**. The safety valve **75** may be disposed behind or downstream of the gas pressure sensor **72** with respect to the gas flow direction.

The safety valve **75** may restrict a maximum pressure of the fermentation container **12** and the gas discharge channel **71**. For example, the safety valve **75** may restrict the maximum pressure of the fermentation container **12** and the gas discharge channel **71** to a pressure of about 3.0 bar.

The gas discharger **7** may further include a pressure release valve **76**. The pressure release valve **76** may be connected to the gas discharge channel **71**. The pressure release valve **76** and the gas discharge valve **73** may be selectively opened/closed. The pressure release valve **76** may be disposed behind or downstream of the gas pressure sensor **72** with respect to the gas flow direction.

A noise reducing device **77** may be mounted on the pressure release valve **76**. The noise reducing device **77** may include at least one of an orifice structure or a muffler structure.

Even though the pressure release valve **76** is opened, an inner pressure of the fermentation container **12** may be gradually decreased by the noise reducing device **77**. When fermentation of the beverage progresses, the pressure release valve **76** may be opened to release the pressure in a state in which the inner pressure of the fermentation container **12** increases. The noise reducing device **77** may effectively

reduce noise generated due to a difference in pressure between the inside and outside of the fermentation container **12**. The pressure release valve **76** may be opened/closed in the fermentation process or operation in which the inner pressure is relatively high.

Hereinafter, the air injector **8** will be described.

The air injector **8** may be connected to the fluid supply module **5** or the first main channel **41** to inject air. The air injector **8** may be connected to an opposite side of a sub channel **91**, which will be described hereinafter, with respect to the heater **53**.

In this case, air injected by the air injector **8** may pass through the heater **53** to flow to the sub channel **91** together with residual fluid within the heater **53**. Thus, the residual fluid within the heater **53** may be removed to maintain a clean state of the heater **53**.

Alternatively, air injected by the air injector **8** to the first main channel **41** may successively pass through the bypass channel **43** and the second main channel **42** and then be injected into the fermentation container **12**. Thus, stirring or aeration may be performed in the fermentation container **12**.

Alternatively, the air injected from the air injector **8** to the first main channel **41** may be guided to the ingredient supplier **3** to flow to the ingredient container mounting portions **31**, **32**, and **33**. Residual fluid or residue within the ingredient containers **C1**, **C2**, and **C3** or the ingredient container mounting portions **31**, **32**, and **33** may flow to the second main channel **42** by the air injected by the air injector **8** and then be discharged to the beverage dispenser **6**. The ingredient containers **C1**, **C2**, and **C3** and the ingredient container mounting portions **31**, **32**, and **33** may be cleanly maintained by the air injected by the air injector **8**.

The air injector **8** may include an air injection channel connected to the fluid supply channel **55b** or the first main channel **41** and air injection pump **82** connected to the air injection channel **81**. An air injection check valve **83** that prevents the fluid within the fluid supply channel **55b** from being introduced into the air injection pump **82** through the air injection channel **81** may be installed in the air injection channel **81**.

The air injection pump **82** may pump the air to the air injection channel **81**. A discharge portion of the air injection pump **82** may be connected to the air injection channel **81**.

Air passing through an air filter **150** may be suctioned into a suction portion of the air injection pump **82**. That is, the beverage maker may include air filter **150** and an air suction channel **152** connected to the air filter **150**. A muffler **150a** that reduces noise generated when the air is suctioned may be installed in the air suction channel **152**.

The air suction channel **152** may be branched into a first suction channel **84** and a second suction channel **153**. The first suction channel **84** may be connected to a suction portion of the air injection pump **82**, and the second suction channel **153** may be connected to a suction portion of an air supply pump **151** described hereinafter. However, embodiments are not limited thereto, and thus, air passing through different filters may be suctioned into the suction portion of the air injection pump **82** and the suction portion of the air supply pump **151**.

Hereinafter, the air controller **15** will be described.

The air controller **15** may control a pressure between the inner wall of the fermenter **112** and the outer surface of the fermentation container **12**. The air controller **15** may supply air into the space between the fermentation container **12** and the fermenter **112**. On the other hand, the air controller **15** may exhaust the air within the space between the fermentation container **12** and the fermenter **112** to the outside.

The air conditioner **15** may include air supply pump **151**, an air supply channel **154** that connects the air supply pump **151** to the fermentation module **1**, an exhaust channel **157** connected to the air supply channel **154** to exhaust air to the outside, and an exhaust valve **156** connected to the exhaust channel **157**. The air supply pump **151** may inject air into the air supply channel **154**. A discharge portion of the air supply pump **151** may be connected to the air supply channel **154**, and a suction portion may be connected to the second suction channel **153** described above.

The air supply channel **154** may be connected to the fermentation module **1**, particularly, the fermentation lid **107**. An air supply channel connection portion **117** to which the air supply channel **154** may be connected may be provided in the fermentation module **1**. The air supply channel connection portion **117** may communicate with the space between the inner wall of the fermenter **112** and the outer surface of the fermentation container **12**.

The air injected from the air supply pump **151** to the air supply channel **154** may be guided between the outer surface of the fermentation container **12** and the inner wall of the fermenter **112**. The air supplied into the fermenter **112** may press the fermentation container **12** between the outer surface of the fermentation container **12** and the inner wall of the fermenter **112**.

The beverage within the fermentation container **12** may be pressed by the fermentation container **12** which is contracted by the air. When the main valve **40** and the beverage dispensing valve **64** are opened, the beverage may pass through the main channel connection portion **115** to flow to the second main channel **42**. The beverage flowing from the fermentation container **12** to the second main channel **42** may be dispensed to the outside through the beverage dispenser **6**.

The air supply pump **151** may supply air so that a predetermined pressure occurs between the fermentation container **12** and the fermenter **112**. Thus, a pressure at which the beverage within the fermentation container **12** is easily dispensed may be occur between the fermentation container **12** and the fermenter **112**.

The air supply pump **151** may be maintained in a turned-off state while the beverage is dispensed. When the beverage is completely dispensed, the air pump **82** may be driven for next beverage dispensing and then stopped. Thus, the beverage maker may dispense the beverage to the beverage dispenser **6** in a state in which the fermentation container **12** is disposed within the fermentation module **1** without withdrawing the fermentation container **12** to the outside of the fermentation module **1**.

The exhaust channel **157** may function as an air exhaust passage, through which the air between the fermentation container **12** and the fermenter **112** may be exhausted to the outside, together with a portion of the air supply channel **154**. The exhaust channel **157** may be disposed outside of the fermentation module **1**. The exhaust channel **157** may be connected to a portion of the air supply channel **154**, which is disposed outside of the fermenter **112**.

The air supply channel **154** may include a first channel connected between the air supply pump **151** to a connection portion **157a**, to which the exhaust channel **157** may be connected, and a second channel between a connection portion **154a**, to which the exhaust channel **157** may be connected, and the air supply channel connection portion **117**. The first channel may be an air supply channel that guides the air pumped by the air supply pump **151** to the second channel. Also, the second channel may be an air supply and exhaust-combined channel that supplies the air

passing through the air supply channel into the space between the fermenter **112** and the fermentation container **12** or guides the air discharged from the space between the fermenter **112** and the fermentation container **12** to the exhaust channel **157**.

The exhaust channel **157** may exhaust air therethrough. The exhaust valve **156** may be opened so that the air between the fermentation container **12** and the fermenter **112** may be exhausted to the outside when the fermentation container **12** is expanded while the beverage is made. The exhaust valve **156** may be opened when fluid is supplied by the fluid supply module **5**. The exhaust valve **156** may be opened when air is injected by the air injector **8**.

The exhaust valve **156** may be opened so that the air between the fermentation container **12** and the fermenter **112** may be exhausted when the beverage within the fermentation container **12** is completely dispensed. The user may take the fermentation container **12** out of the fermenter **112** when the beverage is completely dispensed. This is done because safety accidents occur when the inside of the fermenter **112** is maintained at a high pressure. The exhaust valve **156** may be opened when the beverage within the fermentation container **12** is completely dispensed.

The air controller **15** may further include an air restriction valve **159** that restricts the air pumped by the air supply pump **151** and supplied between the fermentation container **12** and the fermenter **112**. The air restriction valve **159** may be a check valve.

The air restriction valve **159** may be installed in the air supply channel **154**. That is, the air restriction valve **159** may be installed between the air supply pump **151** of the air supply channel **154** and the connection portion **157a** of the exhaust channel **157**.

Hereinafter, the sub channel **91** will be described.

The sub channel **91** may connect the fluid supply module **5** to the beverage dispenser **6**. The sub channel **91** may have one or a first end **91a** connected to the fluid supply channel **55b** and the other or a second end **91b** connected to the beverage dispensing channel **61**.

The sub channel **91** may be connected between the pump **52** and the heater **53** with respect to the fluid supply channel **55b**. The sub channel **91** may be connected to the connection portion **61a** of the second main channel **42** and the beverage dispensing valve **64** with respect to the beverage dispensing channel **61**.

The fluid supplied by the pump **52** and the air pumped by the air injection pump **82** may be guided to the beverage dispensing channel **61** through the sub channel **91** and then dispensed to the dispenser **62**. Thus, residual fluid or beverage remaining in the beverage dispenser **6** may be removed.

A sub valve **92** that opens and closes the sub channel **91** may be installed in the sub channel **91**. The sub valve **92** may be opened to open the sub channel **91** when the beverage is dispensed, or cleaning is performed.

A sub check valve **93** that prevents the beverage of the beverage dispensing channel **61** from flowing back to the fluid supply module **5** may be installed in the sub channel **91**. The sub check valve **93** may be disposed between the sub valve **92** and the beverage dispensing channel **61** with respect to the sub channel **91**.

The sub channel **91** may function as a residual fluid removing channel of the fluid supply module **5**. For example, when the air injection pump **82** is turned on in a state in which the bypass valve **35** and the ingredient supply valve **310** are closed, the sub valve **92** is opened, the air injected into the air injection channel **81** may pass through

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the heater **53** to flow to the sub channel **91**. Then, the air may pass through the sub valve **92** to flow to the beverage dispensing channel **61** and then be dispensed to the dispenser **62**. In this process, the air may be dispensed together with the fluid supply module **5**, more particularly, residual fluid remaining in the heater **53** and the fluid supply channel **55b** so that residual fluid may be removed.

The sub channel **91** may also function as a cleaning channel. When a portion of the beverage is dispensed from the dispenser **62**, and a long time has elapsed until the next dispensing, the dispenser **62** may be cleaned by allowing fluid to flow into the sub channel **91** before performing the next dispensing.

Hereinafter, the air removal module **50** will be described.

The pump **52** may include a gear pump. As the gear pump is used, a lubricant (grease) applied to a surface of an inner rotor and an inner wall of the pump may be gradually exhausted. Then, when used over a certain number of times, a pressure difference between an inlet and an outlet of the pump **52**, which is generated by the gear pump, may gradually decrease. The inlet of the pump **52** may be connected to the tank discharge channel **55a**, and the outlet may be connected to the fluid supply channel **55b**.

The air removal module **50** may temporarily remove flow path resistance acting on the pump **52**. That is, the air in the pump **52** may be removed by the air removal module **50**, and instead, the fluid in the tank **51** may be introduced into the pump **52** by a head pressure. Thus, the pump **52** may smoothly supply fluid through the fluid supply channel **55b**.

The air removal module **50** may include an air removal channel **50a** and an air removal valve **50b** connected to the air removal channel **50a**. The air removal channel **50a** may be connected to the fluid supply channel **55b**. That is, the air removal channel **50a** may be branched from the fluid supply channel **55b**.

The air removal channel **50a** may be connected to a point on the fluid supply channel **55b**, which is adjacent to the pump **52**. For example, the air removal channel **50a** may be connected between the pump **52** and the heater **53** in the fluid supply channel **55b**. In this case, the connection portion between the air removal channel **50a** and the fluid supply channel **55b** may be closer to the pump **52** than the heater **52**.

The air removal valve **50b** may include a solenoid valve. When the air removal valve **50b** is opened, the air removal channel **50a** may be opened, and air in the air removal channel **50a** may be discharged to the outside through the air removal valve **50b**. As a result, the air in the pump **52** may flow into the air removal channel **50a**, and the fluid in the tank **51** may be introduced into the pump **52** by the head pressure.

The beverage maker may maintain the air removal valve **50b** in a closed state when the pump **52** operates so that the fluid does not flow through the fluid supply channel **55b**. In a state in which operation of the pump **52** is stopped, the air removal valve **50b** may be opened. The beverage maker may allow the pump **52** to operate after the air removal valve **50b** is opened for a predetermined period of time, and the air removal valve **50a** is closed when the tank **51** is empty to refill the tank **51**.

FIG. 2 is a perspective view of a beverage maker according to an embodiment. FIG. 3 is a perspective view illustrating a state in which a cover, a residual fluid tray, and an ingredient supplier are removed in the beverage maker of FIG. 2. FIG. 4 is perspective view illustrating a state in which a tank case is removed in the beverage maker of FIG. 3. FIG. 5 is a rear perspective view illustrating the beverage

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maker of FIG. 3. FIG. 6 is a plan view illustrating a state in which a main frame is removed in the beverage maker of FIG. 4.

The beverage maker may include a base **100**. The base **100** may constitute an outer appearance of a bottom surface of the beverage maker and support the fermentation module **1**, the tank **51**, the heater **53**, and a main frame **130**, which are disposed thereabove. As necessary, components supported by the base **100** may be added, removed, or changed.

The beverage maker may further include a residual fluid tray **101** that receives and stores a beverage dropping from the dispenser **62**. The residual fluid tray **101** may be integrated with the base **100** or be coupled to the base **10**. The residual fluid tray **101** may be disposed in front of the base **100**.

The fermentation module **1** may have an approximately cylindrical shape. The fermentation module **1** may be supported by the base **100** at a lower side.

The fermentation module **1** may be disposed above the base **100**. The fermentation module **1** may be disposed and supported on a fermentation module support portion or support **109** of the base **100**.

As described above, the fermentation module **1** may include fermenter module **111** and fermentation lid **107**. Fermentation container **12** (see FIG. 1) may be accommodated in the fermenter module **111**.

Fermenter **112** (see FIG. 1) may be accommodated in the fermentation case **160**. The insulation portion may be disposed between the fermenter **112** and the fermentation case **160** to insulate the fermenter **112**. The evaporator **134** (see FIG. 1) and the heater **14** (see FIG. 1) may be disposed between the insulation portion and the fermenter **112**. That is, the insulation portion may surround the evaporator **134** and/or the heater **14** together with the fermenter **112**. Thus, the temperature of the fermenter **112** may be easily controlled.

The fermentation lid **107** may be disposed above the fermenter module **111** to open and close the fermenter module **111** at an upper side. Lid seating body **179** may be disposed above the fermentation case **160** to support the fermentation lid **107** at a lower side.

The fermentation case **160** may be placed on the fermentation module support **109** of the base **100**. The fermentation lid **107** may be separably connected to the fermenter module **111**, slidably connected to the fermenter module **111**, or rotatably connected to the fermenter module **111**. For example, the fermentation lid **107** may be hinge-coupled to the fermenter module **111**.

A first hinge connection portion **107a** that protrudes backward may be provided on the fermentation lid **107**. The first hinge connection portion **107a** may be hinge-coupled to the fermentation module **179**.

The refrigeration cycle device **13** may include a compressor **131**, a condenser **132**, and the evaporator **134** (see of FIG. 1). The beverage maker may further include a blower fan **135** that cools the condenser **132**.

The refrigeration cycle device **13** may include a heat pump. The refrigeration cycle device **13** may include a refrigerant channel switching valve (not shown). The refrigerant channel switching valve may include a four-way valve. The refrigerant channel switching valve may be connected to each of a suction channel of the compressor **131** and a discharge channel of the compressor **131**, may be connected to the condenser **132** through a condenser connection channel, and may be connected to the evaporator **134** through an evaporator connection channel.

When the fermenter **112** is cooled, the refrigerant channel switching valve may guide refrigerant compressed in the compressor **131** to the condenser **132** and guide refrigerant discharged from the evaporator **134** to the compressor **131**. When the fermenter **112** is heated, the refrigerant channel

switching valve may guide refrigerant compressed in the compressor **131** to the evaporator **134** and guide refrigerant discharged from the condenser **132** to the compressor **131**. The base **100** may support at least a portion of the refrigeration cycle device **13**. For example, the compressor **131** of the refrigeration cycle device **13** may be supported by the base **100**.

A refrigerant pipe (not shown) may be connected to the fermentation module **1**. The refrigerant pipe may be provided in the refrigeration cycle device **13** (see FIG. 1). The refrigerant pipe may connect the condenser **132** to the evaporator **134** (see FIG. 1). An expansion mechanism (not shown) may be installed in the refrigerant pipe.

The refrigerant pipe may pass between a first coupling body **231** and the base **100** of a main frame **230** described hereinafter.

A tank case **149** in which the tank **51** (see FIG. 1) may be accommodated may be disposed above the base **100**. The tank case **149** may be a circular hollow cylinder with an open top surface. The user may insert the tank **51** into the tank case **149** or take the tank **51** out of the tank case **149**. A bottom surface of the tank case **149** may be spaced apart from a top surface of the base **100** in a vertical direction.

A support body **102** that supports the tank case **149** may be disposed on the base **100**, and a first support portion or support **511** supported to contact the support body **102** may be disposed on the tank case **149**.

The support body **102** may protrude upward from the base **100**, and the first support **511** may protrude downward from the tank case **149**. As the support body **102** and the first support **511** extend lengthwise vertically, a bottom surface of the tank case **149** may be spaced apart from the base **100**.

A heater case **113** in which the heater **53** (see FIG. 1) may be accommodated may be installed on the base **100**, and a second support portion or support **514** supported by the heater case **113** may be installed on the tank case **149**.

The heater case **113** may extend lengthwise vertically, and the bottom surface of the tank case **149** may be spaced apart from the base **100**. That is, one or a first side of the tank **51** may be supported by the support body **102** disposed on the base **100**, and the other or a second side may be supported by the heater case **113**.

A machine room **148** may be defined between the tank case **149** and the base **100**. The machine room **148** may refer to a space between the tank case **149** and the base **100**. Components, such as the pump **52**, the air injection pump **82**, and the compressor **131** may be disposed in the machine room **148**.

The tank case **149** may be horizontally spaced apart from the fermentation module **1**. That is, the tank case **149** and the fermentation module **1** may be horizontally spaced apart from each other.

The beverage maker may further include a tank lid **110** that covers an open top surface of the tank **51** (see FIG. 1). The tank **51** may have a hollow cylindrical shape with the open top surface, and the tank lid **110** may open and close the open top surface of the tank **51**. The tank lid **110** may be detachably mounted on the tank **51** or may be hinged to the tank **51**.

The tank lid **110** may have a shape that is the same as or similar to the fermentation lid **107**. Thereby, the beverage maker may have a sense of unity by design.

A height from the base **100** to the fermentation lid **107** may be equal to a height from the base **100** to the tank lid **110**. A top surface of the base **100** to the fermentation lid **107** may be the same height as the top surface from the base **100** to the tank lid **110**.

The beverage maker may include covers **201**, **202**, **210**, and **220** defining an outer appearance of the beverage maker. The covers **201**, **202**, **210**, and **220** may be placed on the base **100**.

The covers **201**, **202**, **210**, and **220** may be integrated with each other; however, embodiments are not limited thereto. For example, a plurality of members or components may be coupled to each other in terms of manufacturing and maintenance.

The covers **201**, **202**, **210**, and **220** may include a fermentation module cover **201**, a tank case cover **202**, a front cover **210**, and a rear cover **220**. Each of the fermentation module cover **201** and the tank case cover **202** may have a hollow shape. A portion of a circumferential surface of each of the fermentation module cover **201** and the tank case cover **202** may be open. The open portion of the circumferential surface may be disposed inside of the beverage maker and may not be exposed to the outside, and thus, the beverage maker may be improved in design.

The fermentation module cover **201** and the tank case cover **202** may surround at least portions of outer circumferences of the fermentation module **1** and the tank case **149**, respectively. The fermentation module cover **201** and the tank cover **51** may protect the fermentation module **1** and the tank case **149** against an external impact.

The fermentation module cover **201** and the tank case cover **202** may be horizontally spaced apart from each other. The fermentation module cover **201** and the tank case cover **202** may have a same height and/or diameter. Thus, the beverage maker may be improved in design due to symmetric structure and unity of the outer appearance thereof.

A top surface of the fermentation module cover **201** may be open, and the fermentation lid **109** may be exposed upward. Also, a top surface of the tank case cover **202** may be open, and the tank lid **110** may be exposed upward. The user may easily open and close the fermentation lid **107** and the tank lid **110**.

The front cover **210** may define an outer appearance of a front side of the beverage maker. The front cover **210** may cover a portion between the fermentation module cover **201** and the tank case cover **202** at the front side.

The front cover **210** may be disposed between the front fermentation module cover **201** and the tank case cover **202**. The front cover **210** may have ends respectively contacting the fermentation module cover **201** and the tank case cover **202**.

The front cover **210** may have a flat plate shape that is vertically disposed. The front cover **210** may have a same height as each of the fermentation module cover **201** and the tank case cover **202**.

The dispenser **62** may be mounted on the front cover **210**. The dispenser **62** may be disposed closer to an upper end of the front cover **210** than a lower end of the front cover **210**. The dispenser **62** may be disposed above the residual fluid tray **101**. The user may manipulate the lever **620** of the dispenser **62** to dispense the beverage.

A dispenser mounting portion or mount **214** on which the dispenser **62** may be mounted may be disposed on the front cover **210**. The dispenser mount **214** may be disposed closer to the upper end of the front cover **210** than the lower end of the front cover **210**.

The beverage maker may include a display (not shown) that displays various pieces of information of the beverage maker. The display **282** may be disposed on the front cover **210**.

The display **282** may be disposed at a portion of the front cover **210**, which is not covered by the dispenser **62**. That is, the display **282** may not overlap the dispenser **62** in a horizontal direction.

The display may include at least one display element of a liquid crystal display (LCD), a light emitting diode (LED), or organic light emitting diode (OLED), and a display printed circuit board (PCB) on which a display element is installed. The display PCB may be mounted on a rear surface of the front cover **210** and electrically connected to a controller **284** described hereinafter.

The beverage maker may include an input that receives a command related to the making of a beverage by the beverage maker. The input may include at least one of a touch screen that receives a user's command in a touch member, a rotary knob held by the user to rotate, and/or a button pushed by the user. For example, the input may include a rotary knob **283**. The rotary knob **283** may be disposed on the front cover **210**. The rotary knob **283** may be disposed below the display.

The rotary knob **283** may function as a button that is pushed by the user. That is, the user may hold the rotary knob **283** so that the rotary knob **283** rotates, or the user may input a control command by pushing a front surface of the rotary knob **283**.

Also, the input may include a touch screen that receives a user's command in a touch manner. The touch screen may be provided on the display, and the display may function as the touch screen. The input may be electrically connected to the controller **284** described hereinafter.

The beverage maker may further include a wireless communication module (not shown). However, embodiments are not limited to kinds of wireless communication modules. For example, the wireless communication module may include a Bluetooth module or a Wi-Fi module.

The wireless communication module may be disposed on a rear surface of the front cover **210**. The wireless communication module may be electrically connected to the controller **284** described hereinafter. The beverage maker may wirelessly communicate with a separate mobile terminal, for example. The user may input a command, inquire about beverage making information, or monitor a making process in real time using the mobile terminal.

The front cover **220** may define an outer appearance of a front side of the beverage maker. The rear cover **220** may cover a portion between the fermentation module cover **201** and the tank case cover **202** at a rear side.

The ingredient supplier **3** may be disposed between the fermentation module **1** and the tank **51**. That is, the ingredient supplier **3** may be disposed between the fermentation module **1** and the tank case **149**. The beverage maker may be compact, and the ingredient supplier **3** may be protected by the fermentation module **1** and the tank case **149**.

At least a portion of each of both side surfaces of the ingredient supplier **3** may be curved. The curved surfaces may contact each of an outer circumference of the fermentation module cover **201** and an outer circumference of the tank case cover **202**.

The ingredient supplier **3** may be disposed above the base **100** so as to be vertically spaced apart from the base **100**. The ingredient supplier **3** may be disposed above the main frame **230**.

The ingredient supplier **3** may be disposed between the front cover **210** and the rear cover **220** in frontward and rearward directions. A front surface of the ingredient supplier **3** may be covered by the front cover **210**, and a rear surface of the ingredient supplier **3** may be covered by the rear cover **220**.

The ingredient supplier **3** may be installed at an approximately central upper portion of the beverage maker. The user may open the ingredient supplier **3** to easily mount or separate ingredient containers **C1**, **C2**, and **C3**.

The beverage maker may include the main frame **230**. At least a portion of the plurality of valves of FIG. **1** may be mounted on the main frame **230**. That is, a plurality of valve mounting portions or mounts to which the plurality of valves may be mounted may be disposed on the main frame **230**. The plurality of valves may include flow rate control valve **54**, ingredient supply valve **310**, main valve **40**, bypass valve **35**, exhaust valve **156**, beverage dispensing valve **64**, sub valve **92**, gas discharge valve **73**, and pressure release valve **76**, for example.

The main frame **230** may be coupled to the fermentation module **1** and the tank case **149**, respectively. The main frame **230** may be spaced apart from the base **100** in the vertical direction.

The main frame **230** may be coupled from the rear side of the tank case **149** and the fermentation module **1**, and the plurality of valve mounts may be disposed on a rear surface of the main frame **230**. Thus, when only the rear cover **220** is removed in the beverage maker, the user may directly access the plurality of valves, and thus, maintenance and repair of the valves may be facilitated.

At least a portion of the main frame **230** may be disposed between the fermentation module **1** and the tank **51**. At least a portion of the main frame **230** may be disposed below the ingredient supplier **3**.

The main frame **230** may include first coupling body **231** coupled to the fermentation module **1**, a second coupling body **232** coupled to the tank case **149**, and a connection body that connects the first coupling body **231** to the second coupling body **232** and at least a portion of which is disposed between the fermentation module **1** and the tank **51**. The connection body **233** may be disposed below the ingredient supplier **3**. At least a portion of the second coupling body **232** may be disposed between a control module **280** and the tank case **149** in the frontward and rearward direction.

A number of valve mounting portions or mounts disposed on the first coupling body **231** may be greater than a number of valve mounting portions or mounts disposed on the second coupling body **232**. This is done because a number of channels connected to the fermentation module **1** may be greater than a number of channels connected to the tank **51**, and a number of valves that restricts a flow of fluid introduced into and discharged from the fermentation module **1** may be greater than a number of valves that restricts a flow of fluid discharged from the tank **51**.

The beverage maker may include the control module **280**. The control module **280** may be an electric component of the beverage maker. The control module **280** may be mounted on the main frame **230** or the tank case **149**.

The control module **280** may be disposed behind the tank case **149**. The control module **280** may be disposed behind the second coupling body **232**.

This is done because a number of valves disposed at the rear side of the fermentation module **1** is greater than a number of valves disposed at the rear side of the tank case **149**. Thus, a space within the beverage maker may be used

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efficiently, and the beverage maker may be compact. The control module 280 may extend lengthwise vertically.

A control module coupling portion 103 that protrudes upward may be disposed on the base 100, and the control module 280 may be coupled to and supported by the control module coupling portion 103. The control module 280 may be coupled to the second coupling body 232 of the tank case 149 and/or the main frame 230.

The control module 280 may include a main PCB and a PCB case 281 in which the main PCB may be built. The main PCB may include controller 284 that substantially controls an operation of each of the components of the beverage maker. The PCB case 281 may be coupled to the main frame 230 and/or the tank case 149 to safely protect the main PCB therein.

The controller 284 provided in the control module 280 may be electrically connected to the wireless communication module. For example, the controller 284 may receive a command received through the wireless communication module, and thus, the beverage may be made. Also, the controller 284 may transmit information related to the beverage maker or the beverage to be made from the wireless communication module to a separate mobile terminal.

The controller 284 may receive the command input into the input. For example, the controller 284 may make a beverage according to a command input by the rotary knob 283. Also, the controller 284 may control the display 282 to output various pieces of information of the beverage maker. For example, the controller 284 may display an amount of dispensed beverage, and an amount of residual beverage, information related to completion of dispensing of the beverage, for example, through the display 282.

The controller 284 may control at least one of the pump 52, the heater 53, the air injection pump 82, the air supply pump 151, or the temperature controller 11. Also, the controller 284 may control at least one of the flow rate control valve 54, the ingredient supply valve 310, the main valve 40, the bypass valve 35, the exhaust valve 156, the beverage dispensing valve 64, the sub valve 92, the gas discharge valve 73, or the pressure release valve 76.

The controller 284 may receive a measured value of at least one of the flow meter 56, the thermistor 54a, the fluid supply temperature sensor 57, the temperature sensor 16, or the gas pressure sensor 72. The controller 284 may detect an inner pressure of the fermentation container 12 by the gas pressure sensor 72 and detect a temperature of the fermenter 112 by the temperature sensor 16. The control module 280 may determine a degree of fermentation of the beverage using the detected pressure or temperature.

The controller 284 may detect a temperature of fluid supplied from the fluid supply module 5 to the first main channel 41 using the fluid supply temperature sensor 57. The controller 284 may control the heater 53 according to the detected temperature of the fluid. The controller 284 may control the temperature controller 11 to maintain the temperature of the fermenter 112 at an adequate temperature.

The controller 284 may accumulate at least one of a time taken to open the dispenser 62, a time taken to drive the air supply pump 151, and a time taken to turn on the main valve 40 after the beverage is completely made, for example. The controller 284 may calculate an amount of dispensed beverage dispensed from the fermentation container 12 according to the accumulated time. The controller 284 may calculate an amount of residual beverage from the calculated amount of dispensed beverage. The controller 284 may determine whether the beverage within the fermentation

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container 12 is completely dispensed from the calculated amount of residual beverage. The controller 284 may determine that the beverage is completely dispensed when it is determined that the beverage within the fermentation container 12 is completely dispensed. In addition, the controller 284 may control an overall operation of the beverage maker.

The beverage maker may further include a condenser case 130. The condenser case 130 may be disposed on the base 100 and may accommodate the condenser 132.

The condenser case 130 may be disposed to face in an oblique direction with respect to the frontward and rearward direction or lateral directions. The compressor 131, the blower fan 135, and the condenser 132 may be disposed in a straight line, and the condenser case 130 may extend lengthwise in a direction parallel to the straight line.

The blower fan 135 may be disposed between the compressor 131 and the condenser 132. The blower fan 135 may blow air into the condenser case 130. The air suctioned from a suction port 251 defined in the base 100 may be blown into the condenser case 130 by the blower fan 135 and then may be discharged to a discharge port defined in the rear cover 220 after being heat-exchanged with the condenser 132.

The blower fan 135 may be coupled to the condenser case 130. As the air blown by the blower fan 135 by the condenser case 130 passes through the condenser 132 completely, heat-exchange efficiency of the condenser 132 may be improved. Also, the condenser case 130 may prevent heat of the condenser 132 from being spread therearound.

The blower fan 135 may be disposed between the compressor 131 and the condenser 132. Thus, the air blown by the blower fan 135 may dissipate at the compressor 131.

An extension portion 130a that extends in a longitudinal direction of the condenser case 130 to guide the air passing through the condenser 132 to a discharge port 271 of the rear cover 220 may be disposed on a top surface of the condenser case 130. The extension portion 130a may serve as an air guide. A reinforcing rib that extends to a top surface of the extension portion 130a may be disposed on the top surface of the condenser case 130.

A condensed fluid accommodation portion 104 may be provided in the base 100. The condensed fluid accommodation portion 104 may be a space in which a gas is discharged from the gas discharge valve 73, and condensed fluid generated therein may be accommodated.

In the process of discharging a gas by the gas discharge valve 73 mounted on the main frame 230, the gas may meet external cold air to generate condensed fluid, and the condensed fluid may drop into the condensed fluid accommodation portion 104 so as to be collected in the condensed fluid accommodation portion 104. The condensed fluid accommodation portion 104 may be disposed behind the fermentation module support 109.

A protrusion portion or protrusion 106 that protrudes upward from the top surface of the base 100 to prevent the condensed fluid from flowing outside of the condensed fluid accommodation portion 104 may be disposed on the base 100. The condensed fluid accommodation portion 104 may communicate with a space defined between the fermentation module 1 and the fermentation module support 109. A communication groove 105 that allows the condensed fluid accommodation portion 104 to communicate with the space may be defined in the base 100.

The condensed fluid accommodated in the condensed fluid accommodation portion 104 may flow into the space between the fermentation module 1 and the fermentation module support 109 so that more condensed fluid may be accommodated. The condensed fluid accommodation por-

tion **104** and the condensed fluid accommodated in the auxiliary space may be naturally evaporated.

FIG. 7 is a rear view of a rear cover according to an embodiment. FIG. 8 is a perspective view of the rear cover of FIG. 7.

The rear cover **220** may be disposed behind the fermentation module **1**, and a plurality of discharge ports **271** may be provided in the rear cover **220**. The condenser case **130** (see FIG. 6) may be disposed to face the plurality of discharge ports **271** of the rear cover **220**. The air blown into the condenser case **130** by the blower fan **135** may be heat-exchanged with the condenser **132** and discharged through the plurality of discharge ports **271**.

The plurality of discharge ports **271** defined in the rear cover **220** may be disposed at a position closer to one or a first end than the other or a second end of the rear cover **220**. The plurality of discharge ports **271** may be disposed at a position closer to a right end or first side than a left end or second side of the rear cover **220**.

Referring to FIGS. 6 and 7, the plurality of discharge ports **271** may overlap with the blower fan **135** in a longitudinal direction of the condenser case **130**. The condenser case **130** may extend in an oblique direction to face the plurality of discharge ports **271**. Therefore, air discharged to the outside of the beverage maker may be prevented from being introduced into the beverage maker through the open discharge ports **271** to improve heat dissipation efficiency.

A through-groove **278** through which a power cord, for example, an electric wire, that supplies power to the beverage maker may pass, may be defined in the rear cover **220**. A power cord fixing portion **273**, on which the power cord may be wound, and a plug hole **274**, into which a plug connected to an end of the power cord may be inserted, may be provided in/on the rear cover **220**. The power cord fixing portion **273** may be provided on a rear surface of the rear cover **220** and may be provided in a pair at left and right or lateral sides. The plug hole **274** may be defined between both power cord fixing portions **273**.

Power cords may be alternately wound and fixed to both power cord fixing portions **273**, and plugs connected to the power cords may be inserted into the plug holes **274**. As a result, the power cords and the plugs may be arranged by the power cord fixing portions **273** and the plug holes **274** when the beverage maker is not in use, and also, discomfort when transporting the product may be solved.

An avoidance portion **272** that prevents interference with the ingredient supplier **3** may be provided at an upper end of the rear cover **220**. The avoidance portion **272** may be formed by cutting a portion of the upper end of the rear cover **220**. A rear end of the ingredient supplier **3** may be disposed in the avoidance portion **272**, and the beverage maker may be compact when compared to a case in which the avoidance portion **272** is not provided.

An air filter mounting portion or mount **276** on which the air filter **150** (see FIG. 1) may be mounted may be disposed on the rear cover **220**. The air filter **150** may filter air suctioned into each suction portion of the air injection pump **82** and the air supply pump **151**.

The air filter mount **276** may be recessed backward from the rear cover **220**. A channel connection portion may be disposed on the air filter mount **276**, and the air suction channel **152** may be connected to the channel connection portion.

A filter mounting portion cover **275** may be detachably provided on the air filter mount **276**. The filter mounting portion cover **275** may cover the air filter mount **276** at the rear side of the rear cover **220**. The filter mounting portion

cover **275** may have a plurality of through-holes through which air may pass. The user may easily replace the air filter **150** by removing the filter mounting portion cover **275** from the air filter mount **276**.

FIG. 9 is a perspective view of a base according to an embodiment. FIG. 10 is a bottom view of the base of FIG. 9.

The base **100** may include the fermentation module support **109**, the condensed fluid accommodation portion **104**, a compressor support portion or support **108**, and a condenser case support portion or support **252**. The fermentation module support **109** may support the fermentation module **1**. The fermentation module support **109** may be disposed at a position closer to a front end than a rear end of the base **100**.

When the fermentation module **1** is placed on the fermentation module support **109**, an auxiliary space **109a** may be defined between the fermentation module **1** and the fermentation module support **109**. The fermentation module support **109** may include a plurality of support frames that protrude upward. The fermentation module **1** may be supported to contact the support frame, and the auxiliary space **109a** may be defined between a bottom surface of the fermentation module **1** and the fermentation module support **109**.

The condensed fluid accommodation portion **104** may accommodate the condensed fluid generated by gas or air discharged from the fermentation module **1**. The condensed fluid accommodation portion **104** may be disposed behind the fermentation module support **109**.

The communication groove **105** which allows the condensed fluid accommodation portion **104** to communicate with the fermentation module support **109** may be defined in the base **100**. The condensed fluid of the condensed fluid accommodation portion **104** may flow into the auxiliary space **109a** defined in the fermentation module support **109** by the communication groove **105**, and also, more condensed fluid may be accommodated and may be widely spread so that an evaporation rate of the condensed fluid may increase.

The protrusion **106** that prevents the condensed fluid from flowing outside of the condensed fluid accommodation portion **104** may be disposed on the base **100**. The protrusion **106** may protrude upward from the top surface of the base **100**. The protrusion **106** may be disposed between the condensed fluid accommodation portion **104** and the condenser case support **252**. The protrusion **106** may prevent the condensed fluid of the condensed fluid accommodation portion **104** from flowing outside of the auxiliary space **109a**.

The compressor support **108** may support the compressor **131** of the refrigeration cycle device **13**. The compressor support **108** may be disposed at a position at which the compressor **131** is disposed under the tank case **149**. The condenser case support **252** may support the condenser case **130**.

The condenser case support **252** may be disposed so that the condenser case **130** is disposed obliquely. The condenser case support **252** may be disposed at a position closer to the rear end than the front end of the base **100**.

The suction port **251** through which air may be suctioned may be provided in the base **100**. The suction port **251** may be a plurality of holes that penetrate vertically. The air suctioned through the suction port **251** may be blown to the condenser **132** within the condenser case **130** by the blower

fan **135**. At least a portion of the suction port **251** may be disposed between the condenser case support **252** and the compressor support **108**.

A residual fluid tray coupling portion **101c** to which the residual fluid tray **101** (see FIG. 2) may be coupled may be disposed on the front end of the base **100**. The support body **102** that supports the tank case **149** may be disposed on the base **100**. The support body **102** may protrude upward from the base **100**, and more specifically, may protrude upward from a top surface of the compressor support **108**.

The support body **102** may be connected to the first support **511** disposed on the tank case **149** to support one side of the tank **51**. The support body **102** may allow the bottom surface of the tank case **149** to be spaced apart from the compressor support **108** to provide a length so that the compressor **131**, the pump **52**, the air injection pump **82**, and the air supply pump **151** may be disposed therebetween.

The control module coupling portion **103** which may be coupled to the control module **280** (see FIG. 5) may be disposed on the base **100**. The control module coupling portion **103** may protrude upward from the base **100**. A plurality of the control module coupling portion **103** may be provided and may be disposed behind the compressor support **108**. A height of the control module coupling portion **103** may be less than a height of the support body **102**.

A through-groove **100a** through which a power cord, for example, an electric wire, to supply power to the beverage maker may pass, may be defined in the base **100**. The through-groove **100a** may be defined in the rear end of the base **100**. The through-groove **100a** defined in the base **100** may be defined under the through-groove **278** (see FIG. 7) defined in the rear cover **220**. The through-groove **100a** defined in the base **100** and the through-groove **278** defined in the rear cover **220** may together form a power cord through-hole.

A plurality of legs **250** that protrudes downward may be provided on the base **100**. For example, four legs **250** may be provided on the base **100**.

Each of the plurality of legs **250** may have a length such that the base **100** is maintained horizontally. A bottom surface of the base **100** may be spaced vertically from an installation surface, on which the beverage maker is installed, by the plurality of legs **250**. Thus, external air may flow between the base **100** and the installation surface and be easily suctioned into the suction port **251**.

FIG. 11 is a perspective view of a tank case cover according to an embodiment. FIG. 12 is a cross-sectional view, taken along line XII-XII' of FIG. 11. FIG. 13 is an enlarged view illustrating a surrounding area of a hook of the tank case cover according to an embodiment.

The tank case cover **202** may cover the machine room **148** (see FIG. 3) and the tank case **149** at one side. The tank case cover **202** may include an outer cover **202a** and an inner cover **202b**, which may be coupled inside of the outer cover **202a**. The outer cover **202a** and the inner cover **202b** may have a shape equal or similar to each other.

Each of the outer cover **202a** and the inner cover **202b** may be integrally provided. The outer cover **202a** may be made of a metal material, and the inner cover **202b** may be made of a non-metal material. The outer cover **202a** may be made of steel, and the inner cover **202b** may be made of injection plastic.

As the outer cover **202a** defining a portion of the outer appearance of the beverage maker is made of the metal material, the appearance of the beverage maker may be luxurious in design. As the inner cover **202b** is made of the non-metal material, a load of the tank case cover **202** may

be prevented from being excessively heavy to facilitate attachment of a sound absorption pad **240** and a sound absorption member **241**, which will be described hereinafter. As the tank case cover **202** includes the outer cover **202a** and the inner cover **202b** which are coupled to each other, the tank case cover **202** may have a higher noise reduction effect than a case in which the tank case cover **202** is provided as an integrated cover having a same thickness.

An upper processed portion **207a** at which an upper end of the outer cover **202a** is curled or bent inward may be disposed on the upper end of the outer cover **202a**. A lower processed portion **207b** at which a lower end of the outer cover **202a** is curled or bent inward may be disposed on the lower end of the outer cover **202a**. As the upper and lower ends of the outer cover **202a** are not sharply formed by the upper processed portion **207a** and the lower processed portion **207b**, the user may be prevented from being injured.

The upper processed portion **207a** may be a curled portion at which the upper end of the outer cover **202a** is curled inward, and the lower processed portion **207b** may be a bent portion at which the lower end of the outer cover **202a** is bent inward. Thus, an upper end of the upper processed portion **207a** shown to the user may be improved in design.

The inner cover **202b** may be disposed between the upper processed portion **207a** and the lower processed portion **207b** in the vertical direction. The inner cover **202b** may be coupled to the outer cover **202a** in the vertical direction.

The tank case cover **202** may include a ring-shaped fixing portion **203**, and a cover portion **204** connected to a portion of a lower end of the fixing portion **203**. The fixing portion **203** may include an outer fixing portion **203a** provided on the outer cover **202a** and an inner fixing portion **203b** provided on the inner cover **202b**.

The cover portion **204** may include an outer cover portion **203a** provided on the outer cover **202a** and an inner cover portion **203b** provided on the inner cover **202b**. The inner fixing portion **203b** may be disposed inside of the outer fixing portion **203a**, and the inner cover portion **204b** may be disposed inside of the outer cover portion **204a**.

An upper circumference of the tank case **149** of the fixing portion **203** may be surrounded. The fixing portion **203** may fix the tank case cover **202** to the tank case **149** in the horizontal direction.

The cover portion **204** may be disposed to be elongated downward from a lower portion of the fixing portion **203**. A cross section of the cover portion **204**, which is cut horizontally, may have arc shape. Both ends of the cover portion **204** may be extend lengthwise vertically. A lower end of the fixing portion **203** may connect both ends of the cover portion **204** to each other.

A portion of the upper portion of the cover portion **204** may face the outer surface of the tank case **149** in the horizontal direction, and a portion of the lower portion may face the machine room **148**. A portion, which connects both ends of the cover portion **204** to each other, in both ends of the cover portion **204** and the lower end of the fixing portion **203** may define an opening together. The opening may be defined between the front cover **210** (see FIG. 2) and the rear cover **220** and may not be visible from outside of the beverage maker.

A plurality of hooks **206** that couples the inner cover **202b** may be disposed on both ends of the outer cover portion **203a**. A plurality of the hooks **206** spaced apart at regular intervals from each other along both ends of the outer cover portion **203a** may be provided. The plurality of hooks **206** may be integrated with the outer cover **202a**.

The plurality of hooks **206** may be hooked with a plurality of hook catching portions **208** disposed on both ends of the inner cover portion **203b**, respectively. The plurality of the hook catching portions **208** may be spaced at regular intervals from each other along both ends of the inner cover portion **203b**.

The plurality of hook catching portion **208** may be stepped with respect to the end of the inner cover portion **203b**. Accordingly, the hook **206** may be firmly caught with the hook catching portion **208**.

The machine room **148** (see FIG. 3) may be defined between the tank case **149** and the base **100**, and a noise source that generates driving noise may be disposed in the machine room **148**. The noise source may be at least one of the pump **52**, the air injection pump **82**, the air supply pump **151**, or the compressor **131**.

The tank case cover **202** may be provided with sound absorption pad **240** and sound absorption member **241** to minimize transmission of noise generated from the noise source to the user. The sound absorption pad **240** may be attached to an inner surface of the tank case cover **202**. The sound absorption pad **240** may be attached to a lower portion of the inner surface of the tank case cover **202**. The sound absorption pad **240** may be attached to a lower portion of an inner surface of the inner cover **202b**.

The sound absorption pad **240** may face the machine room **148** in the horizontal direction. The sound absorption pad **240** may be disposed in the machine room **148**. The sound absorption pad **240** may overlap a gap defined between the inner surface of the tank case cover **202** and the outer surface of the tank case **149** in the vertical direction. Accordingly, the tank case cover **202** may be compact.

The sound absorption pad **240** may be a soft pad and may be attached in a state of being bent along the inner surface of the tank case cover **202**. The suction pad **240** may be attached by being bent in a circumferential direction of the tank case cover **202**.

The sound absorption member **241** may be attached to the inner surface of the tank case cover **202**. The sound absorption member **241** may be attached to the inner surface of the inner cover **202b**.

The sound absorption member **241** may be compressed between the inner surface of the tank case cover **202** and the outer surface of the tank case **149** (see FIG. 3). That is, the sound absorption member **241** may be disposed in a gap between the inner surface of the tank case cover **202** and the outer surface of the tank case **149** to minimize leakage of noise through the gap.

The sound absorption member **241** may be made of an elastic material. The sound absorption member **241** may be pressed and compressed between the tank case cover **202** and the tank case **149**. The sound absorption member **241** may be made of polyethylene foam (PE foam); however, embodiments are not limited thereto.

A plurality of the sound absorption member **241** may be provided. For example, a pair of sound absorption members **241** may be disposed at both ends of the cover portion **204**, respectively.

The sound absorption member **241** may extend lengthwise vertically. The sound absorption member **241** may extend lengthwise vertically along both ends of the cover portion **204**. An upper end of the sound absorption member **241** may be disposed on a horizontal surface with the lower end of the fixing portion **203** or may be adjacent to the horizontal surface.

The sound absorption member **241** may be disposed above the sound absorption pad **240**. A height from the lower

end of the tank case cover **202** to a lower end of the sound absorption member **240** may be higher than a height from the lower end of the tank case cover **202** to an upper end of the sound absorption pad **240**. Thus, the sound absorption pad **240** may not interfere with the tank case **149**, and the tank case cover **202** may be compact.

The sound absorption member **241** may cover the hook **206** disposed on the outer cover portion **202a**. The sound absorption member **241** may compress the hook **206** and a periphery of the hook **206** to minimize leakage of noise through a gap generated by the hook **206**.

FIG. 14 is a schematic flowchart of a method for manufacturing a tank case cover according to an embodiment. Hereinafter, a method of manufacturing a tank case cover **202** will be described. Those skilled in the art will readily understand that the fermentation module cover **201** may also be manufactured in a same or similar manner.

The method for manufacturing the tank case cover **202** may include a plate forming process or operation (S1), processing process or operations (S2 and S3), a rolling process or operation (S4), a welding process or operation (S5), a cutting process or operation (S6), and a coupling process or operation (S7).

The plate forming operation (S1) is an operation of manufacturing a metal plate having an appropriate size. When using a pre-made metal plate, the plate forming operation (S1) may be omitted.

The processing operations (S2 and S3) are operations of curling or bending upper and lower ends of the metal plate to one side. The processing operations (S2 and S3) may include an upper end processing operation (S2) for curling an upper end of the metal plate, and a lower end processing operation (S3) for bending a lower end of the metal plate. The order of the upper end processing operation (S2) and the lower end processing operation (S3) is irrelevant. An upper processed portion **207a** and a lower processed portion **207b** of the outer cover **202a** may be formed by the processing operations (S2 and S3).

The rolling operation (S4) is an operation of rolling the metal plate so that both right and left or lateral ends of the metal plate contact each other. The metal plate may be rolled in a direction in which the upper processed portion **207a** and the lower processed portion **207b** are disposed at the inside.

The welding operation (S5) is an operation of bonding both right and left or lateral ends of the metal plate contacting each other by welding, for example. The outer cover **202a** may have a hollow cylindrical shape by the rolling operation (S4) and the welding operation (S5).

The cutting operation (S6) is an operation of cutting and removing a portion of a circumferential surface to which the lower end of the outer cover **202a** is connected. An opening of the outer cover **202a** may be formed by the cutting operation (S6). The opening of the outer cover **202a** may be defined by both ends of the outer cover portion **204a** and a portion the lower ends of the outer fixing portion **203a**, at which both the ends of the outer cover portion **204a** are connected.

The cutting operation (S6) may be performed by 3D laser cutting, for example. The outer cover **202a** may be cut so that a plurality of protrusions are formed at both ends of the outer cover portion **204a**. The protrusions may protrude from both ends of the outer cover portion **204a** in a circumferential direction of the outer cover portion **204a**. Each of the protrusions may be bent in the bonding operation (S7) to form hook **206**. The protrusion may be a configuration in which the hook **206** is unfolded.

The bonding operation (S7) is an operation of bonding the inner cover **202b** to the inner surface of the outer cover **202a**. The inner cover **202b** may be injection molded separately to correspond to a shape of the outer cover **202a**.

The inner cover **202b** may be fitted between the upper processed portion **207a** and the lower processed portion **207b** of the outer cover **202a**. In this state, the protrusion of the outer cover portion **204a**, which is formed in the cutting operation (S6) may be bent to be hooked with the hook catching portion **208** formed on both ends of the inner cover portion **204b** to form the hook **206**. The inner cover **202b** and the outer cover **202a** may be firmly coupled.

FIG. 15 is an exploded perspective view of a residual fluid tray according to an embodiment. FIG. 16 is a bottom view of the residual fluid tray according to an embodiment.

The residual fluid tray **101** may receive and store beverage dropping from the dispenser **62** (see FIG. 2). The residual fluid tray **101** may be coupled to the base **100** and disposed under the dispenser **62**.

The residual fluid tray **101** may include a tray body **101a**, in which a space S in which the dropping beverage may be accommodated may be defined, and a tray cover **101b** that covers the space S at the upper side. The tray body **101a** may have a box shape with an open top surface. The tray cover **101b** may cover the open top surface of the tray body **101a** and a circumferential surface of the tray body **101a**. A plurality of holes **101c** that penetrate vertically may be defined in the tray cover **101b**.

Among the beverage dropping from the dispenser **62**, the beverage dropping around the beverage container (not shown) may drop into the tray cover **101b** and then be temporarily stored in the residual fluid tray **101** through the holes **101c** of the tray cover **101b**. Therefore, a periphery of the beverage maker may be maintained in a clean state.

The tray cover **101b** may be made of a metal material, and the tray body **101a** may be made of a non-metal material. As the tray cover **101b**, which defines an outer appearance of the residual fluid tray **101**, is made of the metal material, the outer appearance of the beverage maker may be designed in a luxurious manner. As the tray body **101a** is made of the non-metallic material, a load of the residual fluid tray **101** may be prevented from being excessively heavy.

A plurality of hooks **140** that couples the tray body **101a** may be disposed on the tray cover **101b**. The hooks **140** may protrude inward from a lower end of the tray cover **101b**. The plurality of hooks **140** may be spaced apart from each other along the lower end of the tray cover **101b**. A hook catching portion **141** on which each of the hooks **140** is hooked may be disposed on the lower end of the tray body **101a**. The tray cover **101b** and the tray body **101a** may be firmly coupled to each other.

According to embodiments, the sound absorption pad may be attached to the tank case and the cover surrounding the machine room to minimize transmission of noise generated from a noise source disposed in the machine room to outside of the beverage maker. As the sound absorption member is compressed between the case and the tank case, transmission of noise of the machine room to the outside through a gap between the cover and the tank case may be minimized. Further, as the sound absorption pad is disposed in the machine room or disposed to face the machine room, the noise may be reduced with maximum efficiency although the sound absorption pad has a limited size.

In addition, the sound absorption pad may vertically overlap the gap between the inner surface of the cover and the outer surface of the tank case. Therefore, the cover may be compact.

A height from the lower end of the cover to the lower end of the sound absorption member may be higher than a height from the lower end of the cover to the upper end of the sound absorption pad. Therefore, the cover may be more compact.

The cover may include the outer cover made of a metallic material and the inner cover coupled to the inside of the outer cover and made of a nonmetallic material. As a result, when compared to all covers having a same thickness, a noise reduction effect of the cover may be improved, an outer appearance of the cover may be gentrified or improved, and the cover may be prevented from being too heavy.

In addition, the cover may be fixed to the tank case by the fixing portion in a horizontal direction, and the tank case and the machine room may be covered by the cover portion.

The sound absorption member may extend vertically lengthwise along both ends of the cover portion. Therefore, a noise reduction effect may be maximally obtained using the sound absorption member having a limited volume.

The plurality of hooks configured to couple the inner cover may be disposed on the outer cover, and the hook catching portion that is stepped with respect to the end of the inner cover may be disposed on the inner cover. Therefore, the outer cover and the inner cover may be firmly coupled to each other.

The sound absorption member may cover the hook. As a result, noise may be prevented from leaking through a gap around the hook.

The upper processed portion and the lower processed portion may be disposed on upper and lower ends of the outer cover. Therefore, a risk of injury to a user due to a sharp shape of the outer cover may be removed.

The inner cover may be disposed vertically between the upper processed portion and the lower processed portion. Therefore, the inner cover may be restricted and coupled to the outer cover in the vertical direction.

Embodiments disclosed herein provide a beverage maker having reduced operation noise. Embodiments also provide a method for manufacturing a cover that is capable of effectively removing or reducing operation noise of a beverage maker.

In a beverage maker according to embodiments disclosed herein, a sound absorption pad may be attached to the tank case and the cover surrounding the machine room to minimize transmission of noise generated from a noise source disposed in the machine room to outside of the beverage maker. Further, as the sound absorption member is compressed between the case and the tank case, transmission of the noise of the machine room to the outside through a gap between the cover and the tank case may be minimized. Furthermore, as the sound absorption pad is disposed in the machine room or disposed to face the machine room, noise may be reduced with maximum efficiency although the sound absorption pad has a limited size.

A beverage maker according to embodiments disclosed herein may include a base; a tank case which is spaced upward from the base and in which a tank may be accommodated; a machine room defined between the base and the tank case; a cover configured to cover the tank case and the machine room at one side; a sound absorption pad attached to an inner surface of the cover, the sound absorption pad being disposed within the machine room or facing the machine room; and at least one sound absorption member compressed between the inner surface of the cover and an outer surface of the tank case. The beverage maker may further include a fermentation module disposed above the base. The machine room may be provided with at least one

of a pump configured to pump a fluid, such as water within the tank accommodated in the tank case to the fermentation module; an air injection pump configured to inject air into the fermentation module; or a compressor configured to allow a refrigerant that adjusts a temperature of the fermentation module to circulate.

The sound absorption pad may vertically overlap a gap between the inner surface of the cover and the outer surface of the tank case. A height from a lower end of the cover to a lower end of the sound absorption member may be higher than a height from the lower end of the cover to an upper end of the sound absorption pad.

The cover may include an outer cover made of a metallic material, and an inner cover coupled to the inside of the outer cover and made of a nonmetallic material. The outer cover may include a fixing portion having a ring shape to surround an upper circumference of the tank case, and a cover portion that extends lengthwise from a portion of a lower end of the fixing portion.

The inner cover may include an inner fixing portion having a ring shape to surround the upper circumference of the tank case, the inner fixing portion being disposed inside of the fixing portion, and an inner cover portion that extends lengthwise downward from a portion of a lower end of the inner fixing portion, the inner cover portion being disposed inside of the cover portion. The sound absorption member may extend lengthwise vertically along both ends of the cover portion.

A plurality of hooks configured to couple the inner cover may be disposed on both ends of the cover portion. A hook catching portion with which the hook may be hooked and which may be stepped with respect to the end of the inner cover may be disposed on each of both ends of the inner cover. The sound absorption member may cover the hook.

An upper processed portion in which an upper end of the outer cover is curled or bent inward may be disposed on the upper end of the outer cover, and a lower processed portion in which a lower end of the outer cover is curled or bent may be disposed on the lower end of the outer cover. The inner cover may be disposed vertically between the upper processed portion and the lower processed portion.

A method for manufacturing a cover of a beverage maker according to embodiments disclosed herein may include curling or bending upper and lower ends of a metal plate to one side; rolling the metal plate so that both left and right or lateral ends of the metal plate contact each other; bonding both the left and right ends of the metal plate through welding to form an outer cover; cutting and removing a portion of a circumferential surface to which a lower end of the outer cover may be connected; and coupling an inner cover, which may be injection-molded to correspond to a shape of the outer cover, to an inner surface of the outer cover. At least one of a sound absorption pad or a sound absorption member may be attached to an inner surface of the inner cover. In the cutting of the portion of the circumferential surface, a hook configured to couple the inner cover may be provided on the outer cover.

A beverage maker according to embodiments disclosed herein may include a base; a tank case which is spaced upward from the base and in which a tank may be accommodated; a machine room defined between the base and the tank case; and a cover configured to cover the tank case and the machine room at one side. The cover may include an outer cover made of a metallic material, and an inner cover coupled to the inside of the outer cover and made of a nonmetallic material.

The outer cover may include a fixing portion having a ring shape to surround an upper circumference of the tank case, and a cover portion that extends lengthwise from a portion of a lower end of the fixing portion. The inner cover may include an inner fixing portion having a ring shape to surround the upper circumference of the tank case, the inner fixing portion being disposed inside of the fixing portion, and an inner cover portion that extends lengthwise downward from a portion of a lower end of the inner fixing portion, the inner cover portion being disposed inside of the cover portion.

A plurality of hooks configured to couple the inner cover may be disposed on both ends of the cover portion. A plurality of hooks configured to couple the inner cover may be disposed on both ends of the cover portion, and a hook catching portion with which the hook may be hooked and which may be stepped with respect to the end of the inner cover may be disposed on each of both ends of the inner cover.

The details of one or more embodiments are set forth in the accompanying drawings and the description. Other features will be apparent from the description and drawings, and from the claims.

The disclosed subject matter is to be considered illustrative, and not restrictive, and the appended claims are intended to cover all such modifications, enhancements, and other embodiments, which fall within the true spirit and scope. Thus, embodiments are to be considered illustrative, and not restrictive, and the technical spirit is not limited to the embodiments. Therefore, the scope is defined not by the detailed description but by the appended claims, and all differences within the scope will be construed as being included.

It will be understood that when an element or layer is referred to as being “on” another element or layer, the element or layer can be directly on another element or layer or intervening elements or layers. In contrast, when an element is referred to as being “directly on” another element or layer, there are no intervening elements or layers present. As used herein, the term “and/or” includes any and all combinations of one or more of the associated listed items.

It will be understood that, although the terms first, second, third, etc., may be used herein to describe various elements, components, regions, layers and/or sections, these elements, components, regions, layers and/or sections should not be limited by these terms. These terms are only used to distinguish one element, component, region, layer or section from another region, layer or section. Thus, a first element, component, region, layer or section could be termed a second element, component, region, layer or section without departing from the teachings of the present invention.

Spatially relative terms, such as “lower”, “upper” and the like, may be used herein for ease of description to describe the relationship of one element or feature to another element(s) or feature(s) as illustrated in the figures. It will be understood that the spatially relative terms are intended to encompass different orientations of the device in use or operation, in addition to the orientation depicted in the figures. For example, if the device in the figures is turned over, elements described as “lower” relative to other elements or features would then be oriented “upper” relative to the other elements or features. Thus, the exemplary term “lower” can encompass both an orientation of above and below. The device may be otherwise oriented (rotated 90 degrees or at other orientations) and the spatially relative descriptors used herein interpreted accordingly.

The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used herein, the singular forms “a”, “an” and “the” are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms “comprises” and/or “comprising,” when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

Embodiments of the disclosure are described herein with reference to cross-section illustrations that are schematic illustrations of idealized embodiments (and intermediate structures) of the disclosure. As such, variations from the shapes of the illustrations as a result, for example, of manufacturing techniques and/or tolerances, are to be expected. Thus, embodiments of the disclosure should not be construed as limited to the particular shapes of regions illustrated herein but are to include deviations in shapes that result, for example, from manufacturing.

Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

Any reference in this specification to “one embodiment,” “an embodiment,” “example embodiment,” etc., means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment. The appearances of such phrases in various places in the specification are not necessarily all referring to the same embodiment. Further, when a particular feature, structure, or characteristic is described in connection with any embodiment, it is submitted that it is within the purview of one skilled in the art to effect such feature, structure, or characteristic in connection with other ones of the embodiments.

Although embodiments have been described with reference to a number of illustrative embodiments thereof, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will fall within the spirit and scope of the principles of this disclosure. More particularly, various variations and modifications are possible in the component parts and/or arrangements of the subject combination arrangement within the scope of the disclosure, the drawings and the appended claims. In addition to variations and modifications in the component parts and/or arrangements, alternative uses will also be apparent to those skilled in the art.

What is claimed is:

1. A beverage maker, comprising:

a base;

a tank case spaced upward from the base and in which a tank configured to contain a fluid for making a beverage is accommodated;

a machine room defined between the base and the tank case;

a cover configured to cover the tank case and the machine room at one side;

a sound absorption pad attached to an inner surface of the cover, the sound absorption pad being disposed within the machine room or facing the machine room; and

at least one sound absorption member comprising an elastic member compressed between the inner surface of the cover and an outer surface of the tank case, wherein the cover comprises:

an outer cover made of a metallic material; and

an inner cover coupled to an inside of the outer cover and made of a nonmetallic material, and wherein the outer cover comprises:

a fixing portion having a ring shape to surround an upper circumference of the tank case; and

a cover portion that extends lengthwise from a portion of a lower end of the fixing portion.

2. The beverage maker according to claim 1, further comprising a fermentation module disposed above the base, wherein the machine room is provided with at least one of:

a pump configured to pump the fluid within the tank accommodated in the tank case to the fermentation module;

an air injection pump configured to inject air into the fermentation module; or

a compressor configured to compress a refrigerant to adjust a temperature of the fermentation module.

3. The beverage maker according to claim 1, wherein the sound absorption pad vertically overlaps a gap between the inner surface of the cover and the outer surface of the tank case.

4. The beverage maker according to claim 1, wherein a height from a lower end of the cover to a lower end of the at least one sound absorption member is higher than a height from the lower end of the cover to an upper end of the sound absorption pad.

5. The beverage maker according to claim 1, wherein the inner cover comprises:

an inner fixing portion having a ring shape to surround the upper circumference of the tank case, the inner fixing portion being disposed inside of the fixing portion; and

an inner cover portion that extends lengthwise downward from a portion of a lower end of the inner fixing portion, the inner cover portion being disposed inside of the cover portion.

6. The beverage maker according to claim 1, wherein the at least one sound absorption member extends lengthwise vertically along lateral ends of the cover portion.

7. The beverage maker according to claim 1, wherein a plurality of hooks configured to couple the inner cover are disposed on lateral ends of the cover portion.

8. The beverage maker according to claim 7, wherein a hook catching portion with which the plurality of hooks is hooked and which is stepped with respect to lateral ends of the inner cover is disposed on each of the lateral ends of the inner cover.

9. The beverage maker according to claim 7, wherein the at least one sound absorption member covers the plurality of hooks.

10. The beverage maker according to claim 1, wherein an upper processed portion at which an upper end of the outer cover is curled or bent inward is disposed on the upper end of the outer cover, wherein a lower processed portion at which a lower end of the outer cover is curled or bent is disposed on the lower end of the outer cover.

11. The beverage maker according to claim 10, wherein the inner cover is disposed vertically between the upper processed portion and the lower processed portion.